New Application Processing: Undetermined
Check off after completed;   Mark NA when not applicable

Company Name: **U.S. Steel - Gary Works**
Identification Number: **089-20118-00121**
Source Location: One North Broadway, Gary, IN

PRELIMINARY PROCESSING

Receive application, correspondence or permit number request form, making sure the following have been stamped with the date received:
- Application Form A-C-1, GSD-01 or OAI, or first page of Renewal application, permit number request or correspondence.
- Cover letter of the application (if any)
- Copy of check (if any) (may have PS print out with highlighted information in lieu of copy of check)

Assign permit tracking number
- write permit tracking number on all copies of the application, permit number request form or correspondence.
- write permit tracking number and name of company copy of check or highlight info on PS printout (if applicable)
- filing fee received: amount $ 100.00 PS Customer # CST100001138
- Permit fee received: amount $ 500.00 PS Customer # CST100001138

If application, check for the following:
- Signature on signature page of application
- If new source (source does not exist in CAATS) or relocation request, form EE-1, EE-2 and GG
- If existing source, form EE-3 and GG

Enter into CAATS
- enter permit tracking number & source information (including library location, if any) into CAATS

Make copies
- if three copies of the application, correspondence or permit number request form were not submitted, make two copies of the application (double-sided) excluding blueprints, Material Safety Data Sheets (MSDS) and maps.
- if it is within the jurisdiction of a regional office, make an additional copy
- if it is within the jurisdiction of a local agency, make an additional copy
- if it is an initial Title V, make a copy of form GSD-01 for the Billing Dept.
- if it is an initial Fesop, or Fesop Renewal application, make a copy of form GSD-01 or the first 4 pages of the application and a copy of the check or PS print out (if any) for the Billing Dept.
- if it is a SSOA application make a copy of form OA1 and copy of check or PS printout (if any) for the Billing Dept.
- for copies of application forms for the Billing Dept., write "*Air Programs*" at the top of copy and place in Air Programs mailbox in front reception area.

Send bill letter (if applicable)
- Check the fee listing for applicable filing fees, if no filing fee was received, generate an invoice in Peoplesoft

Complete Billing & Refund Sheet (if applicable):
- Billing and Refund Worksheet

If the following forms are not included in the application for **new sources, send an Administrative NOD**
- Form GG
- Form EE-1 and EE-2

For the **Compliance copy** do the following:
- write in red ink "*Compliance*", "*New App.*", or "*Renewal*", "*PBR*", the inspector's initials and the Section Chief's initials (use the compliance inspector assignment list)
- if it is within the jurisdiction of a regional office, on the additional copy write in red ink "*Compliance*", "*New App.*", or "*Renewal*", "*PBR*", and the regional office (NWO, SRO or NRO)
- place copy of application in Compliance mailbox in front reception area

For the **Permit Review Section Copy** do the following:
- complete New Application routing slip
- attach Billing and Refund Worksheet, MSDS, and blueprints (if any)
- give to Iryn Callilung or Don Poole, depending on SIC (or local agency liaison if local agency is writing permit)

For the **Local Agency copy**, do the following:
- if it is within the jurisdiction of a local agency, give a copy to the local agency liaison (Mindy Hahn).

For the **Original**, do the following:
- make a hanging folder for the original application labeled with the company name and the permit tracking number and file application with this checklist, copy of check or PS printout (if any), and copy of GG letters sent (if any), then give the file to the appropriate administrative contact person.

Notify government officials
- Obtain Form GG from the application or obtain a blank form and generate form letters informing the Mayor, County Commissioners and President of Town Council (if any) of the application. *(GG/EE forms are not necessary for name changes administrative amendments, contractor or local agency permit number requests, appeal resolutions, revocations, experimental trails, review requests or permit by rule.)*

KCM 9/28/04

CONSTRUCTION PERMIT APPLICATION
RELINE OF NO. 13 BLAST FURNACE
U.S. STEEL – GARY WORKS
PLANT ID NO. 089-00121

APPENDIX 10-1

Construction Permit Application Forms

CONSTRUCTION PERMIT APPLICATION
RELINE OF NO. 13 BLAST FURNACE
U.S. STEEL – GARY WORKS
PLANT ID NO. 089-00121

APPENDIX 10-1

Construction Permit Application Forms

AIR PERMIT APPLICATION FORM CHECKLIST
State Form 51607 (2-04)
INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

IDEM - Office of Air Quality - Permits Branch
100 N. Senate Avenue
P.O. Box 6015
Indianapolis, IN 46206-6015
Telephone: (317) 233-0178 or
Toll Free: 1-800-451-6027 x30178 (within Indiana)
Facsimile Number: (317) 232-6749
Http://www.IN.gov/idem/air/permits/index.html

NOTES:

- The purpose of this checklist is to help the applicant and IDEM, OAQ ensure that an air permit application packet is administratively complete. This checklist is required for all air permit applications submitted to IDEM, OAQ. Place this checklist between the cover sheet and all subsequent forms and attachments that encompass your air permit application packet.

FOR OFFICE USE ONLY
PERMIT NUMBER:

___ ___ - ___ - ___

Air Permit Application Form Checklist

Check the appropriate box indicating whether or not each application form is Applicable (A) or Not Applicable (N/A) to the source's process operations. In order to reduce paper volume, the Office of Air Quality requests that only those forms pertinent to the permit application be submitted. If neither box is checked, this will halt or prolong the permit review process.

A	N/A	Form Number and Title		A	N/A	Form Number and Title	
		COVER	Application Cover Sheet		X	PI-01	Incineration
X		GSD-01	General Source Data		X	PI-02	Combustion
X		GSD-02	Plant Layout Diagram		X	PI-03	Storage and Handling of Bulk Material
X		GSD-03	Process Flow Diagram		X	PI-04	Asphalt Plants
	X	GSD-04	Stack / Vent Information		X	PI-05	Brick / Clay Products
	X	GSD-05	Emissions Unit Information		X	PI-06	Reciprocating Internal Combustion Engine
X		GSD-06	Particulate Emissions Summary		X	PI-07	Gas Turbine Engines
X		GSD-07	Criteria Pollutant Emissions Summary		X	PI-08	Concrete Batchers
X		GSD-08	HAP Emissions Summary		X	PI-09	Degreasing
	X	GSD-09	Summary of Additional Info.		X	PI-10	Dry Cleaners
	X	GSD-10	Insignificant Activities		X	PI-11	Foundry Operations
	X	GSD-11	Alternative Operating Scenario		X	PI-12	Grain Elevators
X		GSD-12	Affidavit of Nonapplicability		X	PI-13	Lime Manufacturing
	X	GSD-13	Affidavit of Applicability		X	PI-14	Liquid Organic Compound Storage
	X	GSD-14	Owners and Occupants Notified		X	PI-15	Portland Cement Manufacturing
X		GSD-15	Government Officials Notified		X	PI-16	Printing Operations
	X	CE-01	Particulate Control Equipment		X	PI-17	Sand and Gravel Processes
	X	CE-02	Thermal / Catalytic Oxidizers		X	PI-18	Nonmetallic Mineral Processing
	X	CE-03	Adsorbers		X	PI-19	Surface Coating
	X	CE-04	Condensers		X	PI-20	Woodworking / Plastic Machining
	X	CE-05	Miscellaneous Control Equipment		X	PI-21	On-site Soil Remediation
	X	CD-01	Facility / Unit Compliance Status		X	PI-22	Fugitive Emissions / Vehicle Traffic
	X	CD-02	Compliance Plan by Applicable Requirement		X	PI-23	Pneumatic Blasting
	X	CD-03	Compliance Plan by Facility / Unit		X	PI-24	Reinforced Plastics / Composites
	X	CD-04	Compliance Schedule		X	PI-25	Welding / Cutting of Metal
	X	CD-05	Compliance Certification		X	PI-26	Miscellaneous Processes

Air Permit Application Form Checklist

Check the appropriate box indicating whether or not each application form is Applicable (A) or Not Applicable (N/A) to the source's process operations. In order to reduce paper volume, the Office of Air Quality requests that only those forms pertinent to the permit application be submitted. If neither box is checked, this will halt or prolong the permit review process.

A	N/A	Form Number and Title		A	N/A	Form Number and Title	
	X	CAM-01	Compliance Assurance Monitoring		X	PI-27	Fugitive VOC / HAP Emissions
					X	PI-28	Mechanical Blasting
					X	PI-29	Electroplating Operations
					X	PI-30	Chromium Electroplating and Anodizing Operations

AIR PERMIT APPLICATION COVER SHEET
State Form 50639 (R/2-04)
INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

IDEM - Office of Air Quality - Permits Branch
100 N. Senate Avenue
P.O. Box 6015
Indianapolis, IN 46206-6015
Telephone: (317) 233-0178 or
Toll Free: 1-800-451-6027 x30178 (within Indiana)
Facsimile Number: (317) 232-6749
Http://www.IN.gov/idem/air/permits/index.html

FOR OFFICE USE ONLY
PERMIT NUMBER: 089-20115-00121
DATE APPLICATION WAS RECEIVED: RECEIVED SEP 24 2004

NOTES:

- The purpose of this cover sheet is to obtain the core information needed to process the air permit application. This cover sheet is required for all air permit applications submitted to IDEM, OAQ. Place this cover sheet on top of all subsequent forms and attachments that encompass your air permit application packet.
- Submit the completed air permit application packet, including all forms and attachments and the appropriate filing fee (if applicable), to the **IDEM Cashier** and the local agency (if applicable).
- Detailed **instructions** for this form are available online at http://www.IN.gov/idem/air/permits/apps/instructions/coverinstructions.pdf.

1. Tax ID Number: 25-1897152

PART A: Purpose Of Application

Part A is intended to identify the purpose of this air permit application. For the purposes of this form, the term "source" refers to the plant site as a whole and NOT to individual emissions units.

2. Source Name: U.S. Steel – Gary Works | **3.** Source ID: 089-00121

4. Billing Address: One North Broadway

City: Gary | State: IN | ZIP Code: 46206

5. Permit Level: ☐ Exemption ☐ Registration ☐ SSOA ☐ PBR ☐ MSOP ☐ FESOP ☒ TVOP ☐ Acid Rain

6. Permit Type: ☐ Initial ☐ Renewal ☐ Combination ☐ Closure ☐ Withdrawal ☐ Relocation
☐ Notice Only Change ☐ Administrative Amendment ☒ Modification / Revision ☐ Review Request
☐ Interim Approval ☐ Transition (between permit levels) ☐ General Permit (if available)
☐ PSD ☐ Emission Offset ☐ MACT Preconstruction Review ☐ Emission Reduction Credit Registry

7. Is this an application for an initial construction and/or operating permit for a "greenfield" source? ☐ Yes ☒ No

8. Is this an application for construction of a new emissions unit at an existing source? ☐ Yes ☒ No

PART B: Confidential Business Information

Part B is intended to identify permit applications that require special care to ensure that confidential business information is kept separate from the public file. Claims of confidentiality must be made at the time the information is submitted to IDEM, and must follow the requirements set out in the Indiana Administrative Code (IAC). To ensure that your information remains confidential, refer to the IDEM, OAQ information regarding submittal of confidential business information. For more information on confidentiality for certain types of business information, please review IDEM's Nonrule Policy Document Air-031-NPD regarding Emission Data.

9. Is any of the information contained within this application being claimed as confidential business information?

☐ Yes ☒ No

PART C: Certification Of Truth, Accuracy, And Completeness

Part C is intended to be the official certification that the information contained within the air permit application packet is truthful, accurate, and complete. Any air permit application packet that we receive without a signed certification will be deemed incomplete and may result in denial of the permit.

☒ *I certify under penalty of law that, based on information and belief formed after reasonable inquiry, the statements and information contained in this application are true, accurate, and complete.*

James Alexander Manager, — Name *(typed)*
Environmental Air Compliance — Title

J S Alexander — Signature
9/23/04 — Date

RCVD SEP 24 '04

GSD-01 GENERAL SOURCE DATA — BASIC SOURCE LEVEL INFORMATION

State Form 50640 (R2/2-04)
INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

IDEM - Office of Air Quality - Permits Branch
100 N. Senate Avenue
P.O. Box 6015
Indianapolis, IN 46206-6015
Telephone: (317) 233-0178 or
Toll Free: 1-800-451-6027 x30178 (within Indiana)
Facsimile Number: (317) 232-6749
Http://www.IN.gov/idem/air/permits/index.html

NOTES:

- The purpose of GSD-01 is to provide essential information about the entire source of air pollutant emissions. GSD-01 is a required form.
- Detailed **instructions** for this form are available online at http://www.IN.gov/idem/air/permits/apps/instructions/gsd01instructions.pdf.
- All information submitted to IDEM will be made available to the public unless it is submitted under a claim of confidentiality. Claims of confidentiality must be made at the time the information is submitted to IDEM, and must follow the requirements set out in 326 IAC 17.1-4-1. Failure to follow these requirements exactly, will result in your information becoming a public record, available for public inspection.

FOR OFFICE USE ONLY

PERMIT NUMBER:

089 - 20118 - 00121

PART A: SOURCE LOCATION INFORMATION

1. Source Name: U.S. Steel – Gary Works
2. Portable/Stationary: Is this a portable or stationary source? ☐ Portable ☒ Stationary
3. Location Address: One North Broadway
   City: Gary | State: IN | ZIP Code: 46206
4. County Name: Lake | 5. Township Name: Calumet
6. Geographic Coordinates:
   Latitude: 41° 37' | Longitude: 87° 20'
7. Universal Transferal Mercadum Coordinates *(if known)*:
   Zone: 16 | Horizontal: n 4,606,834 | Vertical: E 473,220
8. Adjacent States: Is the source located within 50 miles of an adjacent state?
   ☐ No ☐ Yes – *Indicate Adjacent State(s):* ☐ Illinois (IL) ☐ Michigan (MI) ☐ Ohio (OH) ☐ Kentucky (KY)
9. Attainment Area Designation: Is the source located within a non-attainment area for any of the criteria air pollutants?
   ☐ No ☐ Yes – *Indicate Non-attainment Pollutant(s):* ☐ CO ☐ Pb ☐ NO_x ☐ O_3 ☐ PM/PM_{10} ☐ SO_2

PART B: SOURCE STATUS

10. Source Name History: Has this source recently been operated under any other name(s)?
    ☒ No ☐ Yes – *Past Source Name:*
11. Source Location History: Has the location of this source recently changed?
    ☒ No ☐ Yes – *Past Location Address:*
    City: | State: | ZIP Code:
    County Name: | Township Name:
12. Permitting Level: Has a permitting level been established for this source? ☐ No ☒ Yes – *Indicate level below:*
    ☐ Registration ☐ SSOA ☐ Permit by Rule ☐ MSOP ☐ FESOP ☒ TVOP ☐ Exemption
13. Existing Approvals: Have any exemptions, registrations, or permits been issued to this source?
    ☐ No ☒ Yes – *List these permits and their corresponding emissions units in Part I, Existing Approvals.*
14. Unpermitted Emissions Units: Does this source have any unpermitted emissions units?
    ☒ No ☐ Yes – *List all unpermitted emissions units in Part J, Unpermitted Emissions Units.*
15. New Source Review: Is this source proposing to construct or modify any emissions units?
    ☐ No ☒ Yes – *List all proposed new construction in Part K, New or Modified Emissions Units.*
16. Risk Management Plan: Has this source submitted a Risk Management Plan?
    ☒ Not Required ☐ No ☐ Yes → Date submitted: ___/___/___ EPA Facility Identifier: ______

RCVD SEP 24 '04

PART C: SOURCE CONTACT INFORMATION

17. Name of Source Contact Person : James Alexander		
18. Title *(optional)*: Manager, Environmental Air Compliance, USS – Gary Works		
19. Mailing Address: One North Broadway		
City: Gary	State: IN	ZIP Code: 46206
20. Internet Address *(optional)*: jalexander@uss.com		
21. Electronic Mail Address *(optional)*:		
22. Telephone Number: (219) 888 – 3387	**23.** Facsimile Number *(optional)*: (219) 888 – 5498	

PART D: AUTHORIZED INDIVIDUAL/RESPONSIBLE OFFICIAL INFORMATION

24. Name of Authorized Individual or Responsible Official: Raymond Terza		
25. Title: General Manager, USS – Gary Works		
26. Mailing Address: One North Broadway		
City: Gary	State: IN	ZIP Code: 46206
27. Telephone Number: (219) 888 – 4402	**28.** Facsimile Number *(optional)*:	

PART E: OWNER INFORMATION

29. Name of Owner: U.S. Steel Corporation		
30. Name of Owner Contact Person : James Alexander		
31. Mailing Address: One North Broadway		
City: Gary	State: IN	ZIP Code: 46206
32. Telephone Number: (219) 888 – 3387	**33.** Facsimile Number *(optional)*: (818) 888 – 5489	
34. Operator: Does the "Owner" company also operate the source to which this application applies?		
☐ No – *Proceed to Part F below.*	☒ Yes – *Enter "SAME AS OWNER" on line 35 and proceed to Part G below.*	

PART F: OPERATOR INFORMATION

35. Name of Operator: U.S. Steel Corporation		
36. Name of Operator Contact Person : James Alexander		
37. Mailing Address: One North Broadway		
City: Gary	State: IN	ZIP Code:46206
38. Telephone Number: (219) 888 – 3387	**39.** Facsimile Number *(optional)*: (219) 888 – 5489	

PART G: AGENT INFORMATION

40. Name of Agent: N/A			
41. Name of Agent Contact Person :			
42. Mailing Address:			
City:	State:	ZIP Code:	
43. Electronic Mail Address *(optional)*:			
44. Telephone Number: ( ) –	**45.** Facsimile Number *(optional)*: ( ) –		
46. Request for Follow-up: Does the "Agent" wish to receive a copy of the preliminary findings during the public notice period (if applicable) and a copy of the final determination?		☐ No	☐ Yes

PART H: SOURCE PROCESS DESCRIPTION				
	47. Process Description	48. Products	49. SIC Code	50. NAICS Code
a.	Integrated Steel Mill	Semi-finished Flat Rolled (hot roller and cold rolled product)		
b.				
c.				
d.				

PART I: EXISTING APPROVALS			
	51. Permit ID	52. Emissions Unit ID	53. Expiration Date
a.	T089-7663-0021	Draft Title V Permit	
b.			
c.			
d.			

PART J: UNPERMITTED EMISSIONS UNITS					
	54. Emissions Unit ID	55. Type of Emissions Unit	56. Actual Dates		
			Began Construction	Completed Construction	Began Operation
a.		N/A			
b.					
c.					
d.					
e.					

PART K: NEW OR MODIFIED EMISSIONS UNITS							
	57. Emissions Unit ID	58. NEW	59. MOD	60. Type of Emissions Unit	61. Estimated Dates		
					Begin Construction	Complete Construction	Begin Operation
a.	B0369		X	No. 13 Blast Furnace	June 2005	September 2005	October 2005
b.							
c.							
d.							
e.							

PART L: LOCAL LIBRARY INFORMATION

62. Date application packet was filed with the local library: September 24, 2004

63. Name of Library: City of Gary Public Library

64. Name of Librarian *(optional)*:

65. Mailing Address: 220 West 5th Avenue

City: Gary | State: IN | ZIP Code: 46402

66. Internet Address *(optional)*:

67. Electronic Mail Address *(optional)*:

68. Telephone Number: (219) 888 – 5498 | **69.** Facsimile Number *(optional)*: –

GSD-02 GENERAL SOURCE DATA — PLANT LAYOUT DIAGRAM
State Form 51605 (2-04)
INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

IDEM - Office of Air Quality - Permits Branch
100 N. Senate Avenue
P.O. Box 6015
Indianapolis, IN 46206-6015
Telephone: (317) 233-0178 or
Toll Free: 1-800-451-6027 x30178 (within Indiana)
Facsimile Number: (317) 232-6749
Http://www.IN.gov/idem/air/permits/index.html

NOTES:

- This form and the Plant Layout diagram are required for all applications. If you do not provide the necessary information, applicable to your source, the application process may be stopped.
- Detailed instructions for this form are available online at http://www.IN.gov/idem/air/permits/apps/instructions/gsd02instructions.pdf
- A Detailed example Plant Layout Diagram is available online at http://www.IN.gov/idem/air/permits/apps/instructions/PLDexample.pdf
- All information submitted to IDEM will be made available to the public unless it is submitted under a claim of confidentiality. Claims of confidentiality must be made at the time the information is submitted to IDEM, and must follow the requirements set out in 326 IAC 17.1-4-1. Failure to follow these requirements exactly, will result in your information becoming a public record, available for public inspection.

FOR OFFICE USE ONLY
PERMIT NUMBER:

Part A: Basic Plant Layout

Part A is intended to provide IDEM, OAQ with the appropriate information about all buildings and access-limiting features in and around the plant site. **Please use this table as a checklist.** You must provide scaled drawings, with the actual scale shown. All dimensions and units must be clearly indicated with a brief explanation of what is being shown. Include the following (*All measurements should be given in feet.*):

1. ☒ Building Dimensions	2. ☒ Building Distance to Property Lines
3. ☒ Surrounding Building Dimensions	4. ☒ Distance to the Nearest Residence
5. ☒ UTM Location Coordinates	6. ☒ Compass (pointing North)
7. ☒ Access-Limiting Features: ☒ Identification	☒ Distance ☒ Length

Part B: Stack Information

Part B is intended to provide IDEM, OAQ with the appropriate information about all stacks, roof monitors, control devices, and process vents at the plant site. **Please use this table as a checklist.** You must show the location of all applicable emission points and include all relevant stack and emissions unit identification numbers for each. In addition, you will need to identify each of these emission points under "Stack Identification" on form GSD-04, Stack/Vent Information. Include the following (*All measurements should be in feet.*):

8. ☒ Exhaust Stacks	9. ☐ Process Vents
10. ☒ Roof Monitors ☐ *No Roof Monitors*	11. ☒ Control Devices ☐ *No Control Devices*
12. ☐ Doors ☐ Windows	☐ Interior Vents ☐ *No Interior Vents*

Part C: Roadway Information

Part C is intended to provide IDEM, OAQ with the appropriate information about the roadways in and around the plant site. **Please use this table as a checklist.** Include the following (*All measurements should be in feet.*):

13. ☒ Adjacent Roadways ☒ Interior Roadways
14. ☒ Roadway Surface Description (gravel, dirt, paved, etc.)
15. ☒ Number of Lanes

Part D: Source Building Information

This table is intended to provide detailed information about each building at the plant site that is part of the source. If additional space is needed, you may make a copy of this table. (*All measurements should be given in feet.*)

16. Building ID	**17. Building Description**	**18. Building Dimensions**			**19. Distance & direction to the nearest property line** (feet & compass coordinate)	**20. Distance & direction to the nearest access limiting feature** (feet & compass coordinate)	**21. Distance & direction to the nearest residence** (feet & compass coordinate)
		Length (feet)	**Width** (feet)	**Height** (feet)			
	Building and stack information as previously submitted to Office of Air Quality, Technical Support and Modeling Section						

Part E: Surrounding Building / Residence Information

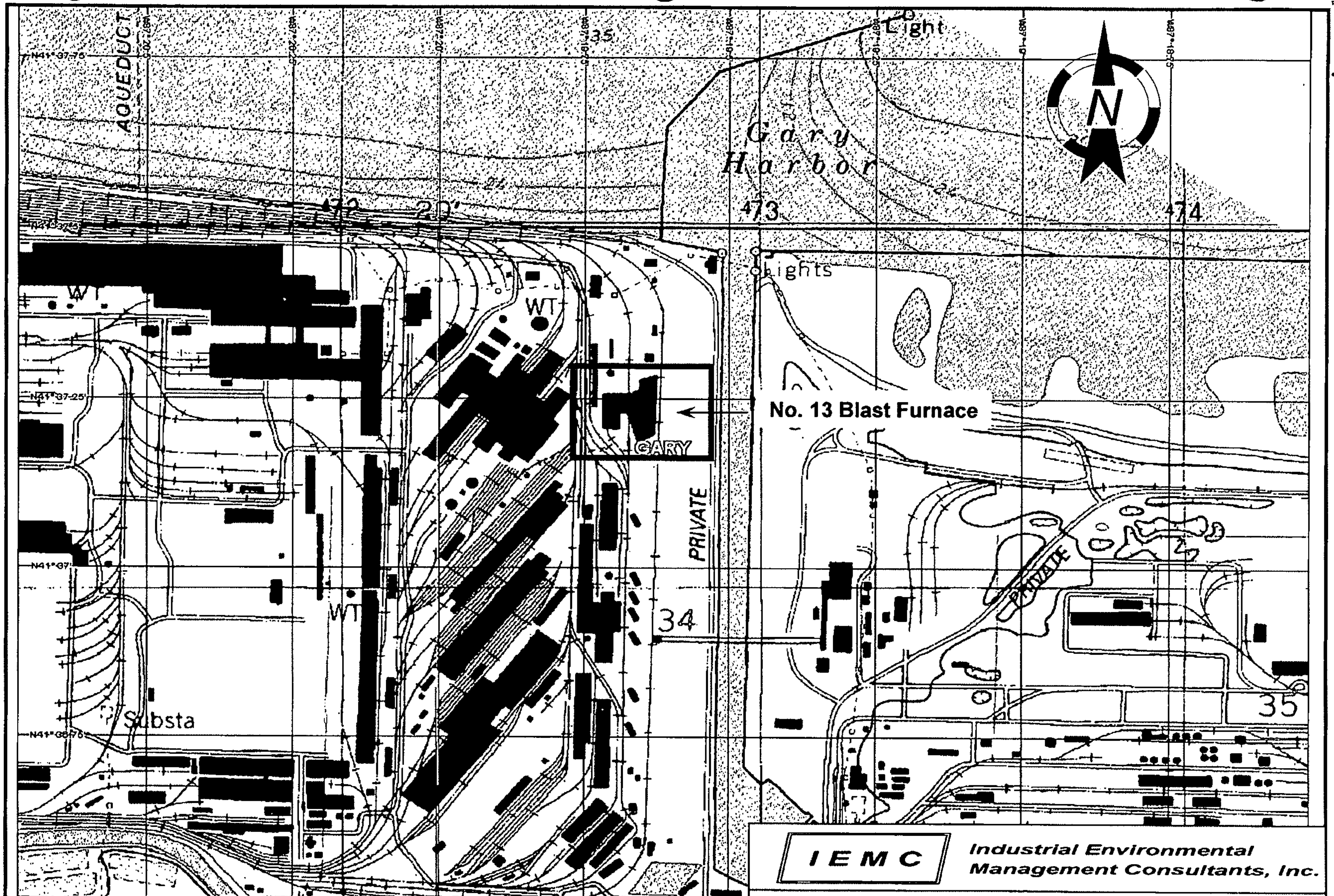
This table is intended to provide detailed information about each building or residence surrounding the plant site. If additional space is needed, you may make a copy of this table. (*All measurements should be given in feet.*)

22. Surrounding Building / Residence Description	23. Surrounding Building / Residence Property Dimensions			24. Distance & direction to the nearest property line (feet & compass coordinate)	25. Distance & direction to the nearest access limiting feature (feet & compass coordinate)	26. Building ID of nearest building on the plant site	27. Distance & direction to the nearest building on the plant site (feet & compass coordinate)
	Length (feet)	Width (feet)	Height (feet)				

Part F: Plant Layout Diagram

This space is intended to provide a place for a hand drawn plant layout diagram. It is **optional** to use this space to create your plant layout.

See Attached Figure GSD-02-1



IEMC Industrial Environmental Management Consultants, Inc.

804 WABASH AVE., CHESTERTON, IN 46304 (219) 929 - 4487 FAX (219) 929 - 4105

U. S. STEEL - GARY WORKS
MAP SHOWING LOCATION OF
NO. 13 BLAST FURNACE FACILITY

DRAWN:	NDH	SCALE:	NTS	DATE:	08/19/04
CHECKED:	EWB	DWG #:	1359		
FILE:	USSG04026				

Figure GSD - 02 - 1

GSD-03 GENERAL SOURCE DATA — PROCESS FLOW DIAGRAM
State Form 51599 (2-04)
INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

IDEM - Office of Air Quality - Permits Branch
100 N. Senate Avenue
P.O. Box 6015
Indianapolis, IN 46206-6015
Telephone: (317) 233-0178 or
Toll Free: 1-800-451-6027 x30178 (within Indiana)
Facsimile Number: (317) 232-6749
Http://www.IN.gov/idem/air/permits/index.html

NOTES:

- This form and the Process Flow Diagram are required for all applications. This form consists of a checklist for identifying the information to be included on the Process Flow Diagram. All throughputs should be given in pounds per hour. If you do not provide the necessary information, applicable to your source, the application process may be stopped.
- Detailed instructions for this form are available online at http://www.IN.gov/idem/air/permits/apps/instructions/gsd03instructions.pdf
- A Detailed example Process Flow Diagram is available online at http://www.IN.gov/idem/air/permits/apps/instructions/PLDexample.pdf
- All information submitted to IDEM will be made available to the public unless it is submitted under a claim of confidentiality. Claims of confidentiality must be made at the time the information is submitted to IDEM, and must follow the requirements set out in 326 IAC 17.1-4-1. Failure to follow these requirements exactly, will result in your information becoming a public record, available for public inspection.

FOR OFFICE USE ONLY
PERMIT NUMBER:

___ ____ - ______ - ______

Part A: Process Flow Diagram

Part A is intended to provide sufficient information to understanding the process.

1. Process Description: Modification and Reline of No. Blast Furnace

2. ☒Process Equipment	3. ☒Raw Material Input Coal, Coke, Pellets and Flux, Sinter
4. ☒Process Throughput	5. ☒Additions ☒Deletions ☒Modifications

Use the space below to briefly explain the impacts of the additional equipment, the reason for removing any equipment, and/or the reason for the proposed modification. (*If additional space is needed, please attach a separate sheet with the information and indicate in the space below that additional information is attached.*)

See Section 2.09 description of the project

Part B: Process Operation Schedule

Part B is intended to indicate the actual (or estimated actual) hours of operation for the process.

6. ☒Process Operation Schedule 24 Hours per Day 7 Days per Week 52 Weeks Per Year

Use the space below to include as much information as is known about scheduled periods of downtime for this process. (*If additional space is needed, please attach a separate sheet with the information and indicate in the space below that additional information is attached.*)

Part C: Emissions Point Information

Part C is intended to provide information about each potential outlet of air pollutant emissions to the atmosphere.

7. ☒Stack / Vent Information Baghouse Stack ID No. 6187, Stove Stack ID No. 6184
8. ☒Pollutants Emitted PM_1, PM_{10}, SO_2, NO_x, CO, VOC, Pb, and HAP's
9. ☒Air Pollution Control Equipment Baghouse, Low NO_x Burner

Part D: Process Flow Diagram

This space is intended to provide a place for a hand drawn process flow diagram. It is **optional** to use this space to create your process flow diagram.

SEE ATTACHED FIGURE GSD-03-1

GSD-06 GENERAL SOURCE DATA — PARTICULATE EMISSIONS

State Form 51612 (2-04)

INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

IDEM - Office of Air Quality - Permit Branch
100 N. Senate Avenue
P.O. Box 6015
Indianapolis, IN 46206-6015
Telephone: (317) 233-0178 or
Toll Free: 1-800-451-6027 x30178 (within Indiana)
Facsimile Number: (317) 232-6749
Http://www.IN.gov/idem/air/permits/index.html

IDEM

NOTES:

- This form is required for all air permit applications.
- The purpose of this form is to provide basic information about each source of particulate emissions.
- Detailed instructions for this form are available online at http://www.IN.gov/idem/air/permits/apps/instructions/gsd06instructions.pdf.
- All information submitted to IDEM will be made available to the public unless it is submitted under a claim of confidentiality. Claims of confidentiality must be made at the time the information is submitted to IDEM, and must follow the requirements set out in 326 IAC 17.1-4-1. Failure to follow these requirements exactly, will result in your information becoming a public record, available for public inspection.

FOR OFFICE USE ONLY

PERMIT NUMBER:

___ ___ - ______ - ______

Part A: Particulate Matter Emissions

Part A is intended to provide a summary of the type and amount of particulate emissions at the source. The state rules on particulate emissions are found in Title 326 of the Indiana Administrative Code, Article 6, Particulate Rules. If you do not provide the enough information to adequately describe each source of particulate emissions, the application process may be stopped. If additional space is needed, you may make a copy of this table.

Emissions Point		**Potential To Emit** (tons per year)						
1. **ID**	2. **Description**	3. **PM**	4. **PM-10**	5. **PM-2.5**	6. **TSP**	7. **Fugitive Dust**	8. **Fugitive PM**	9. **HAP PM**
	See Section 3.0 of Report							
	The calculated emission rates are							
	based on the emission increases							
	attendant to the project.							

Part C: Control of Particulate Emissions

Part C is intended to gather information about how each source of particulate emissions is controlled. If you do not provide the enough information to adequately describe how each source of particulate emissions is controlled, the application process may be stopped. If additional space is needed, you may make a copy of this table.

10. **Emissions Point ID**	11. **Control Measure**	12. **Control Measure Description**	13. **Control Plan**
	☐ No Control ☐ Dust Suppression ☐ Other: ________		☐ No ☐ Yes Date Submitted:
	☐ No Control ☐ Dust Suppression ☐ Other: ________		☐ No ☐ Yes Date Submitted:
	☐ No Control ☐ Dust Suppression ☐ Other: ________		☐ No ☐ Yes Date Submitted:
	☐ No Control ☐ Dust Suppression ☐ Other: ________		☐ No ☐ Yes Date Submitted:
	☐ No Control ☐ Dust Suppression ☐ Other: ________		☐ No ☐ Yes Date Submitted:
	☐ No Control ☐ Dust Suppression ☐ Other: ________		☐ No ☐ Yes Date Submitted:
	☐ No Control ☐ Dust Suppression ☐ Other: ________		☐ No ☐ Yes Date Submitted:

GSD-07 GENERAL SOURCE DATA —
CRITERIA POLLUTANT EMISSIONS SUMMARY

State Form 51602 (2-04)
INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

IDEM - Office of Air Quality - Permits Branch
100 N. Senate Avenue
P.O. Box 6015
Indianapolis, IN 46206-6015
Telephone: (317) 233-0178 or
Toll Free: 1-800-451-6027 x30178 (within Indiana)
Facsimile Number: (317) 232-6749
Http://www.IN.gov/idem/air/permits/index.html

FOR OFFICE USE ONLY
PERMIT NUMBER:

___ ____ - ________ - ________

NOTES:

- This form is required for all air permit applications.
- The purpose of this form is to provide the actual and potential emissions of each criteria pollutant emitted from the source.
- Detailed instructions for this form are available online at http://www.IN.gov/idem/air/permits/apps/instructions/gsd07instructions.pdf.
- All information submitted to IDEM will be made available to the public unless it is submitted under a claim of confidentiality. Claims of confidentiality must be made at the time the information is submitted to IDEM, and must follow the requirements set out in 326 IAC 17.1-4-1. Failure to follow these requirements exactly, will result in your information becoming a public record, available for public inspection.

Part A: Unit Emissions Summary

Part A is intended to provide the actual and potential emissions of each criteria pollutant emitted from each emissions unit. If you do not provide the enough information to adequately describe the emissions from each emissions unit, the application process may be stopped.

1. Unit ID	2. Stack / Vent ID	3. Criteria Pollutant	4. Actual Emissions		5. Potential To Emit	
			Standard Units	Tons Per Year	Standard Units	Tons Per Year
	See Section 3.1 of Report					
	The calculated emission rates are based on the emissions increases attendant to the project					

Part B: Pollutant Emissions Summary

Part B is intended to provide the total actual and potential emissions of each criteria pollutant emitted from the source (including all emissions units and fugitive emissions at the source). If you do not provide the enough information to adequately describe the total source emissions, the application process may be stopped.

6. Criteria Pollutant	7. Actual Emissions		8. Potential To Emit	
	Standard Units	Tons Per Year	Standard Units	Tons Per Year

GSD-08 GENERAL SOURCE DATA —
HAZARDOUS AIR POLLUTANT EMISSIONS SUMMARY
State Form 51604 (2-04)
INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

IDEM - Office of Air Quality - Permits Branch
100 N. Senate Avenue
P.O. Box 6015
Indianapolis, IN 46206-6015
Telephone: (317) 233-0178 or
Toll Free: 1-800-451-6027 x30178 (within Indiana)
Facsimile Number: (317) 232-6749
Http://www.IN.gov/idem/air/permits/index.html

FOR OFFICE USE ONLY
PERMIT NUMBER:

___ ____ - ______ - ______

NOTES:

- This form is required for all air permit applications.
- The purpose of this form is to provide the actual and potential emissions of each hazardous air pollutant emitted from the source.
- Detailed instructions for this form are available online at http://www.IN.gov/idem/air/permits/apps/instructions/gsd08instructions.pdf.
- All information submitted to IDEM will be made available to the public unless it is submitted under a claim of confidentiality. Claims of confidentiality must be made at the time the information is submitted to IDEM, and must follow the requirements set out in 326 IAC 17.1-4-1. Failure to follow these requirements exactly, will result in your information becoming a public record, available for public inspection.

Part A: Unit Emissions Summary

Part A is intended to provide the actual and potential emissions of each hazardous air pollutant emitted from each emissions unit. If you do not provide the enough information to adequately describe the emissions from each emissions unit, the application process may be stopped.

1. Unit ID	2. Stack / Vent ID	3. Hazardous Air Pollutant	4. CAS No.	5. Actual Emissions		6. Potential To Emit	
				Standard Units	Tons Per Year	Standard Units	Tons Per Year
		See Section 3.2 of the Report					
		The calculated emission rates are based on the emissions increases attendant to the project					

Part B: Pollutant Emissions Summary

Part B is intended to provide the total actual and potential emissions of each hazardous air pollutant emitted from the source (including all emissions units and fugitive emissions at the source). If you do not provide the enough information to adequately describe the total source emissions, the application process may be stopped.

7. Hazardous Air Pollutant	8. CAS No.	9. Actual Emissions		10. Potential To Emit	
		Standard Units	Tons Per Year	Standard Units	Tons Per Year

GSD-12 GENERAL SOURCE DATA — AFFIDAVIT OF NONAPPLICABILITY
State Form 51600 (2-04)
INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

IDEM - Office of Air Quality - Permits Branch
100 N. Senate Avenue
P.O. Box 6015
Indianapolis, IN 46206-6015
Telephone: (317) 233-0178 or
Toll Free: 1-800-451-6027 x30178 (within Indiana)
Facsimile Number: (317) 232-6749
Http://www.IN.gov/idem/air/permits/index.html

NOTES:

- The purpose of GSD-12 is to certify that the requirement to notify adjacent landowners and occupants is not applicable to the source of air pollutant emissions.
- Detailed instructions for this form are available online at http://www.IN.gov/idem/air/permits/apps/instructions/gsd13instructions.pdf.
- All information submitted to IDEM will be made available to the public unless it is submitted under a claim of confidentiality. Claims of confidentiality must be made at the time the information is submitted to IDEM, and must follow the requirements set out in 326 IAC 17.1-4-1. Failure to follow these requirements exactly, will result in your information becoming a public record, available for public inspection.

FOR OFFICE USE ONLY

PERMIT NUMBER:

___ ___ - ______ - ______

PART A: Affidavit Of Nonapplicability

Complete this form to certify that the requirement to notify adjacent landowners and occupants pursuant to Indiana Code (IC) 13-15-8 is not applicable to the source of air pollutant emissions. This form must be notarized by a public notary.

James Alexander , being first duly sworn upon oath, deposes and says:

1. I live in Porter County, State of Indiana, and being of sound mind and over twenty-one (21) years of age, I am competent to give this affidavit.
2. I hold the position of Manager, Environmental Air Compliance for U.S. Steel – Gary Works (permit applicant's or facility's name).
3. By virtue of my position with U.S. Steel – Gary Works (permit applicant's name), I am authorized to make the representation contained in this affidavit on behalf of the facility.
4. I understand that the notice requirements of Ind. Code § 13-15-8 do not apply to ______________ (permit applicant's or facility's name) for purposes of the accompanying permit application.
5. **Further Affiant Saith Not.**

☒ I affirm under the penalty for perjury that the representations contained in this affidavit are true, to the best of my information and belief.

James Alexander Manager, Environmental Air Compliance
Name *(typed)* Title

Jo alex 9/23/04
Signature Date

STATE OF Indiana COUNTY OF Porter

PART B: Notarization

This section must be completed by a Public Notary.

Before me a notary Public in and for said County and State, personally appeared James Alexander, and being first duly sworn by me upon oath, says that the fact stated in the foregoing instrument are true. Signed and sealed this 23rd of September, 20 04.

Leslie

Printed: Lesley K. Chapman

My Commission Expires: July 26, 2009

Residence of Porter County

GSD-15 GENERAL SOURCE DATA — GOVERNMENT OFFICIALS NOTIFIED

State Form 51608 (R/7-04)
INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

IDEM

IDEM - Office of Air Quality - Permits Branch
100 N. Senate Avenue
P.O. Box 6015
Indianapolis, IN 46206-6015
Telephone: (317) 233-0178 or
Toll Free: 1-800-451-6027 x30178 (within Indiana)
Facsimile Number: (317) 232-6749
Http://www.IN.gov/idem/air/permits/index.html

NOTES:

- The purpose of GSD-15 is to identify local government officials that are to be notified that an air permit application has been submitted.
- Detailed instructions for this form are available online at http://www.IN.gov/idem/air/permits/apps/instructions/gsd15instructions.pdf.
- All information submitted to IDEM will be made available to the public unless it is submitted under a claim of confidentiality. Claims of confidentiality must be made at the time the information is submitted to IDEM, and must follow the requirements set out in 326 IAC 17.1-4-1. Failure to follow these requirements exactly will result in your information becoming a public record, available for public inspection.

FOR OFFICE USE ONLY

PERMIT NUMBER:

___ ____ - ______ - ______

Government Officials Notified

Use this table to identify local government officials that should be notified pursuant to Indiana Code (IC) 13-15-3-1 that an air permit application has been submitted. If you need additional space, you may make copies of this form.

1. Name: Scott King		**2.** Date Notified:
3. Title: Mayor of Gary		
4. Address: 401 Broadway		
City: Gary	State: IN	ZIP Code: 46402
5. Electronic Mail: sking@ci.gary.in.us	**6.** Telephone Number: (219) 881-1301	
7. Method of Notification: ☐ Telephone ☐ Electronic Mail ☐ Standard Mail ☐ Other ______		
Name: Lake County Board of Commissioners		Date Notified:
Title: Lake County Board of Commissioners		
Address: Lake County Government Center, 889 South Court Street		
City: Crown Point	State: IN	ZIP Code: 46307
Electronic Mail:	Telephone Number: (219) 226-0175	
Method of Notification: ☒ Telephone ☐ Electronic Mail ☐ Standard Mail ☐ Other ______		
Name:		Date Notified:
Title:		
Address:		
City:	State:	ZIP Code:
Electronic Mail:	Telephone Number:	
Method of Notification: ☐ Telephone ☐ Electronic Mail ☐ Standard Mail ☐ Other ______		
Name:		Date Notified:
Title:		
Address:		
City:	State:	ZIP Code:
Electronic Mail:	Telephone Number:	
Method of Notification: ☐ Telephone ☐ Electronic Mail ☐ Standard Mail ☐ Other ______		

Indiana Department of Environmental Management
Office of Air Management
Permit Application
State Form 49533 (11-99)

FORM PSD/EO-01
PSD/Emission Offset Checklist
10/99

PSD / EMISSION OFFSET CHECKLIST

Complete this form for each Prevention of Significant Deterioration (PSD) and/or Emission Offset (EO) application submitted. For each analysis and/or review requirement listed in each Table, place a checkmark in the appropriate column (AC@ -- complete, AI@ -- incomplete, and AN/A@ -- not applicable). Indicate whether or not the required information is attached by placing a AY@ or an AN@ in the AAttached?@ column.

Source Information			
Company Name:		**Source ID:**	

A. PSD Checklist - 326 IAC 2-2					
Rule Cite	**Description**	**C**	**I**	**N/A**	**Attached?**
326 IAC 2-2-3	Control Technology Review; requirements (Use Forms BACT-01, -01a, -01b, & -02)	X			X
326 IAC 2-2-4	Air Quality Analysis; requirements	X			X
326 IAC 2-2-5	Air Quality Impact; requirements	X			X
326 IAC 2-2-6	Increment Consumption; requirements	X			X
326 IAC 2-2-7	Additional Analysis; requirements	X			X
326 IAC 2-2-8	Stack Height Provisions	X			X
326 IAC 2-2-9	Innovative Control Technology			X	
326 IAC 2-2-10	Source Information	X			X

B. Emission Offset Checklist - 326 IAC 2-3					
Rule Cite	**Description**	**C**	**I**	**N/A**	**Attached?**
	Applicable Requirements				
	< Applicable Requirements			X	
	< Lowest Achievable Emission Rate (LAER)	X			X
	< Best Available Control Technology (BACT)	X			X
	< Compliance Status				
326 IAC 2-3-3	< Alternative Sites/ Sizes/ Production Analysis			X	
326 IAC 2-3-4	Banking of Emission Offsets			X	
326 IAC 2-3-5	Location of Offsetting Emissions		X		

ANALYSIS OF BEST AVAILABLE CONTROL TECHNOLOGY

Complete this form for each analysis of Best Available Control Technology (BACT). An individual BACT Analysis form should contain information regarding only one pollutant-facility combination; therefore, a facility with multiple pollutants subject to BACT would have multiple BACT Analyses for that facility.

A. Facility Background

Source:		**Pollutant of Concern:**	
Facility:	SEE SECTION 8.0	**Segment ID:**	
Unit ID:		**SCC*:**	
Stack ID:		**Applicable Rule:****	

* SCC refers to the Source Classification Code.
** 326 IAC 2-2 (Permit Review Rules: Prevention of Significant Deterioration (PSD) Requirements)
** 326 IAC 2-3 (Permit Review Rules: Emission Offset)
** 326 IAC 8-1-6 (Volatile Organic Compound Rules: New Facilities; General Reduction Requirements)

B. Facility Potential to Emit (PTE*) in tons per year (tpy)

Carbon Monoxide (CO):		**Particulate Matter less than 10µm (PM_{10}):**		**Sulfur Dioxide (SO_2):**	
Nitrogen Oxides (NO_X):		**Total Particulates (PM):**		**Volatile Organic Compounds (VOCs):**	
Other (please specify):					

* PTE means Potential to Emit as defined in 326 IAC 2-1.1-1(16).

C. Summary of Existing BACT Determinations					
Facility:		Unit ID:		Pollutant:	

Provide the following summary information regarding the top BACT Determinations from five sources with a facility similar to your own. List these determinations in top-down order from the most to the least effective in terms of emission reduction potential/lowest emission rate. (i.e., Source A should have the most stringent BACT Determination, and Source E should have the least stringent BACT Determination.) In addition, complete FORM BACT-01a BACKGROUND SEARCH - EXISTING BACT DETERMINATIONS to provide more detailed information regarding each of the five determinations to be listed below.

Source	Affected Facility	BACT Determination	Reference
A.	SEE SECTION 8.0		
B.			
C.			
D.			
E.			

Refer to Chapter B of the "New Source Review (NSR) Workshop Manual" (Draft edition, October 1990).

D. All BACT Options Considered

List all BACT options considered, and identify which options are technically feasible. If a BACT option is determined to be technically infeasible, specify the reason in the Comments/Rationale column. Do not list items determined to be infeasible later in Tables E, F, G, and H.

Facility:		Unit ID:		Pollutant:	

BACT Option	Technically Feasible? (Y/N)	Comments / Rationale
		SEE SECTION 8.0

Refer to Chapter B of the "New Source Review (NSR) Workshop Manual" (Draft edition, October 1990).

E. Ranking of Technically Feasible BACT Options

List all technically feasible BACT options ranked in descending order of Overall System Pollution Reduction Efficiency. Use this same ranking in Tables F, G, and H.

Facility:		**Unit ID:**		**Pollutant:**	
Baseline Emissions Rate (tpy):					

BACT Option	Post-BACT Emissions Rate (tpy)	Emissions Reduction (tpy)*	Overall System Pollution Reduction Efficiency (%)

* Emissions reduction in relation to PTE is the difference between the PTE before BACT is implemented and the PTE after BACT is implemented. Refer to Chapter B of the "New Source Review (NSR) Workshop Manual" (Draft edition, October 1990).

F. Economic Analysis

Provide the following economic information for each of the BACT options listed in Table E for which economic impacts are to be considered. Complete FORM BACT-01b COST/ECONOMIC IMPACT ANALYSIS for each option listed in this table.

Facility:		Unit ID:		Pollutant:	

BACT Option	Total Annualized Cost (TAC) ($/year)	Cost Effectiveness ($/ton)		Comments / Rationale**
		Average	Incremental (optional)	
				SEE SECTION 8.0

* Refer to the "Office of Air Quality Planning and Standards (OAQPS) Control Cost Manual" (5th edition, February 1996) and Chapter B of the "New Source Review (NSR) Workshop Manual" (Draft edition, October 1990).
** Use this column to indicate whether any of the listed options may be economically infeasible.

G. Environmental Impact Analysis*

Provide the following information regarding environmental impacts for each of the BACT options listed in Table E.

Facility:		Unit ID:		Pollutant:	

BACT Option	Toxics Impact**		Adverse Impact***	
	Yes/No	amount/ton	Yes/No	amount/ton
	SEE SECTION 8.0			

* Refer to Chapter B of the "New Source Review (NSR) Workshop Manual" (Draft edition, October 1990).
** Indicate whether air toxics are generated or eliminated due to the implementation of the BACT option. Quantify the amount generated or eliminated per ton of pollutant controlled.
*** Indicate whether other adverse environmental impacts are generated or eliminated due to the implementation of the BACT option. Quantify the amount of additional waste generated or eliminated per ton of pollutant controlled.

H. Energy Impact Analysis*

Provide the following information regarding energy impacts** for each of the BACT options listed in Table E.

Facility:		Unit ID:		Pollutant:	

BACT Option	Baseline (specify units): Incremental increase over baseline (specify units)
	SEE SECTION 8.0

* Refer to Chapter B of the "new Source Review (NSR) Workshop Manual" (Draft edition, October 1990).
** Energy impacts are the difference between the total project energy requirements without the BACT option and total project energy requirements with the BACT option.

Indiana Department of Environmental Management
Office of Air Management
Permit Application
State Form 49554 (11/99)

FORM BACT-01
BACT Analysis
1/2000

I. BACT Recommendation

Facility:		Unit ID:		Pollutant:	
BACT Option Recommended:					
JUSTIFICATION:					
SEE SECTION 8.0					

J. Additional Forms/Attachments

Indicate the number of each type of form included as part of this BACT analysis.

	FORM BACT-01a: BACKGROUND SEARCH - EXISTING BACT DETERMINATIONS *(Mandatory)*
	FORM BACT-01b: COST / ECONOMIC IMPACT ANALYSIS *(Mandatory for each economic consideration)*
	FORM BACT-02: SUMMARY OF BEST AVAILABLE CONTROL TECHNOLOGY *(Mandatory)*
	FORM PSD/EO-01: PSD / EMISSION OFFSET CHECKLIST *(Mandatory for 326 IAC 2-2 and/or 2-3)*
	Additional Attachments: List all supplemental documents in the space below.

Indiana Department of Environmental Management
Office of Air Management
Permit Application
State Form 49554 (11/99)

FORM BACT-02
Summary of BACT
1/2000

SUMMARY OF BEST AVAILABLE CONTROL TECHNOLOGY

List each facility subject to the BACT requirements. For each facility listed, indicate the Unit ID, Stack ID, and all pollutants that are subject to the BACT requirements. A FORM BACT-01 ANALYSIS OF BEST AVAILABLE CONTROL TECHNOLOGY should be completed for each pollutant-facility combination listed in this table.

Facilities Subject to BACT

			Pollutants Subject to BACT							
Facility Name	**Unit ID**	**Stack ID**	**PM**	**PM_{10}**	**SO_2**	**NO_X**	**CO**	**VOC**	**Other** (please specify)	
No. 13 Blast Furnace Casthouse			X	X	X	X	X			
No. 13 Blast Furnace Slag Pit			X	X	X	X	X			
No. 13 Blast Furnace Stove			X	X	X	X	X			
	SEE SECTION 8.0									
Baseline Project Emissions Total in tons per year (tpy):					SEE SECTION 3.0					
Post-BACT Project Emissions Total in tons per year (tpy):										

Copy page as necessary

CONSTRUCTION PERMIT APPLICATION
RELINE OF NO. 13 BLAST FURNACE
U.S. STEEL – GARY WORKS
PLANT ID NO. 089-00121

Prepared for:
U.S. STEEL – GARY WORKS
ONE NORTH BROADWAY
GARY, INDIANA 46402

Prepared by:
INDUSTRIAL ENVIRONMENTAL MANAGEMENT CONSULTANTS, INC.
804 WABASH AVENUE
CHESTERTON, INDIANA 46304

SEPTEMBER 2004

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1.0 INTRODUCTION

United States Steel Corporation (USS) owns and operates a fully integrated iron and steel mill in Gary, Indiana (USS–Gary Works). The steel mill is located in northern Lake County, Indiana on the southern shore of Lake Michigan. Figure 1-1 is a map showing the location of the USS facility.

USS operates four blast furnaces at the facility. USS is proposing to reline No. 13 Blast Furnace, the largest of the three blast furnaces. The purpose of the project is to increase the hot metal (molten iron) production at No. 13 Blast Furnace, thus increasing the steel production at the plant's downstream No. 1 BOP Shop and No. 2 Q-BOP Shop.

The increased hot metal production at No. 13 Blast Furnace will require increased consumption of pulverized coal from the plant's Pulverized Coal Injection (PCI) Facility and increased consumption of self-fluxing, iron-bearing pellets at No. 13 Blast Furnace. The increased hot metal production at No. 13 Blast Furnace will result in increased production and consumption of blast furnace gas (BFG). The net effect of the changes in BFG production and consumption will be additional BFG available for combustion/steam generation at the Turboblower Boiler House.

The project schedule calls for commencement of construction at No. 13 Blast Furnace no later than June 2005 and for operations of the relined blast furnace to commence in September 2005.

The USS-Gary Works plant is located in an area of Lake County Indiana that is classified as non-attainment for sulfur dioxide (SO_2) and as severe non-attainment under the 1-hour ozone standard and moderate non-attainment under the 8-hour ozone standard. The area is classified as attainment for particulate matter less than ten microns in aerodynamic diameter (PM_{10}). The area is unclassified for carbon monoxide (CO) and oxides of nitrogen (NOx). The results of emissions netting calculations demonstrate that the proposed project is a major modification project with respect to net emissions of PM_{10}, SO_2, NO_x and CO and a minor modification project with respect to emission of volatile organic compounds (VOC). Therefore, the project is subject to Prevention of Significant Deterioration (PSD) requirements specified at Indiana Rule 326 IAC 2-2 for PM_{10} and CO and Non-attainment New Source Review (NSR) requirements specified at Indiana Rule 326 IAC 2-3 for SO_2 and NO_x as a precursor to ozone.

The results of the Ambient Air Quality Analysis air dispersion modeling demonstrates that the predicted impacts of the project from increased emissions of PM_{10}, CO and NOx on ambient air at and beyond the plant property boundaries are below Significant Impact Levels (SILs) and/or National Ambient Air Quality Standards for all averaging periods. This, in turn, demonstrates that the project will not adversely impact ambient air quality at receptors specified by the Indiana Department of Environmental Management. The results of Level III, county-wide modeling for SO_2 demonstrates continued maintenance of the Ambient Air Quality Standards after the project.

The results of the Best Available Control Technology (BACT) Analysis demonstrate that the currently employed air pollution control equipment and practices at No. 13 Blast Furnace constitute BACT for CO, SO_2, and NO_x. For PM_{10}, the bag material at the No. 13 Blast Furnace will be changed to satisfy BACT requirements..

2.0 DESCRIPTION OF THE PROJECT

The project is intended to increase the production of steel at the plant. The additional hot metal that will be produced at No. 13 Blast Furnace will be utilized at the plant's two steelmaking facilities, No. 1 BOP Shop and No. 2 Q-BOP Shop, to produce steel.

Figure 2-1 is a schematic process flow diagram showing those facilities where production/throughput rates will be affected by the project.

The following subsections describe the physical changes to be made at No. 13 Blast Furnace and the effects of these changes on the blast furnace, as well as on other facilities at the plant that will be affected by the project. Although affected by the physical change to No. 13 BF, no other existing units at the facility will undergo or require physical changes or changes in the methods of operation to accommodate the increased hot metal and steel production. There will be some changes at the steelmaking shops to enhance operations as described below. The projected increase in emissions from all of the affected units are accounted for in the air quality analysis and net emission increase analysis as required by the applicable PSD and NSR regulations and policies.

2.1 No. 13 Blast Furnace

Hot metal (molten iron) currently is produced at four blast furnaces (Nos. 4, 6, 8 and 13). Iron-bearing materials, carbon-bearing materials and flux are charged into the tops of the furnaces. Heated air (hot blast air) is forced into the bottoms of the furnaces. Coal and natural gas is injected into the hot blast as it enters the furnace. The heated air oxidizes (burns) the carbon in the furnace burden and injected fuels to form carbon monoxide (CO). The carbon oxidation reaction gives off heat, which melts the burden material. This process reduces the iron oxides in the furnace to molten elemental iron. The reduction and melting process is referred to as smelting.

The flux, which is added with the burden, reacts with non-ferrous elements (impurities) in the iron-bearing and carbon-bearing materials to separate them from the molten iron. These reactions form a molten slag, which is lighter than the molten iron and floats on the surface of the hot metal. When the molten content of the furnace is tapped, the hot metal and slag flow from the taphole into an iron trough. The trough is equipped with a slag skimmer, which diverts the floating slag to slag runners, which then direct the slag to an outdoor slag granulation facility or to the slag pit. The hot metal flows under the skimmer from the trough into iron runners, which direct the hot metal to refractory lined "submarine cars". These rail cars transport the hot metal to the steelmaking shops.

The hot blast air is supplied from heating stoves. Cold blast air, under pressure produced by turboblowers, is passed through a lattice of heated refractory brickwork (checkerwork) where it is heated to hot blast air. The checkerwork is heated by the combustion of blast furnace gas, a by-product of the smelting process, and some natural gas. Blast furnace gas has a low heating value and some natural gas is added to augment heat supplied to the checkerwork. The project is expected to result in an increase in BFG generation at No. 13 Blast Furnace of 30,480 MMSCF/yr. The corresponding increase in natural gas consumption at the stoves is estimated to be 8,047 MMSCF/yr.

The project will only involve changes to No. 13 Blast Furnace and will not affect Nos. 4, 6 and 8 Blast Furnaces. The following changes will be made to No. 13 Blast Furnace.

- The furnace refractory lining will be torn out and replaced with new, thinner refractory brick. This will affect an increase in the working volume of the furnace.
- The top charging system will be removed and replaced with a new "bell-less" changing system.
- New copper staves will be placed in the mantle area of the furnace.
- New copper cooling plates will be installed.
- A new bustle pipe will be installed.
- Repairs of the checkerwork brick in the stoves will be made.
- Various structural, mechanical and electrical repairs will be made.
- The slag granulator will be enlarged and equipped with a stack.
- Changes to the casthouse and casthouse emissions control system will be implemented to improve capture efficiency of hoods at the tap holes, iron troughs and runners.
- The existing system for cleaning blast furnace gas will be replaced with a more efficient scrubbing system.

The project is expected to result in an increase in the hot metal production capacity at No. 13 Blast Furnace by approximately 609,600 tons per year, thus increasing the total annual production of hot metal to approximately 3.650 million tons per year.

2.2 No. 1 BOP Shop and No. 2 Q-BOP Shop

The Basic Oxygen Process (BOP) steelmaking process essentially consists of removing carbon and other impurities from molten iron to produce molten steel. The hot metal produced at the blast furnaces is charged into refractory-lined vessels along with steel scrap, fluxing agents and metallurgical additives. The conversion to steel is done by blowing oxygen through a lance at supersonic speed into the molten bath Oxygen is also introduced into the molten bath through injectors at the bottom of the vessel. The reaction of oxygen with the carbon forms carbon monoxide, which is released from the molten bath and burned to carbon dioxide (CO_2) prior to discharge to the atmosphere. The oxidation reaction produces heat and removes carbon from the bath. Reactions of the non-ferrous impurities with flux produces a slag. The slag and molten steel are tapped from the furnace. After refinement in a Ladle Metalluray Furnace or Vacuum Degasser, the molten steel is cast into steel slabs at the continuous casters. Each of the two BOP Shops is equipped with a continuous caster.

The additional hot metal that will result from the project will be utilized at either the two BOP Shops to produce additional steel. It is expected that the project will increase plantwide production of steel by approximately 717,200 tons per year.

There are also other associated changes to be made at the steelmaking shops to ensure steady-state (heats per day) steelmaking operations. These include the installation of a sublance (steel sampling) system and a relocation and upgrade of post-desulfurization hot metal slag skimming stations at No. 2 Q-BOP Shop. At No. 1 BOP Shop a new steel sampling system similar to a sublance system is planned.

2.3 Pulverized Coal Injection Facility

The carbon-bearing materials used at No. 13 Blast Furnace are coke, pulverized coal, oil/tar and natural gas. The pulverized coal is produced at the Pulverized Coal Injection (PCI) Facility, where selected coals are received and processed (crushed, dryed and screened). Coal from the PCI Facility is pneumatically transported to No. 13 Blast Furnace.

Although no physical changes will be made at the PCI facility and the capacity of the facility will not be affected, the project will result in an increase in the actual rate of PCI consumption at No. 13 Blast Furnace and in the actual amount of PCI produced at the PCI Facility. It is expected that PCI production will be increased by approximately 91,400 tons as a result of the project.

2.4 Self Fluxing Pellets Handling Facilities

The primary iron-bearing materials utilized at No. 13 Blast Furnace are self-fluxing pellets and sinter. The pellets contain both iron oxide and limestone. Sinter is a fused iron and flux-bearing material produced at the plant's Sinter Plant. The project will result in an increase in the consumption of pellets at No. 13 Blast Furnace of approximately 827,500 tons per year. No physical changes to the pellets, receipt, storage and handling facilities will be made.

2.5 Turboblower Boiler House (TBBH)

The blast furnace smelting process generates a by-product gas referred to as blast furnace gas (BFG). The BFG contains high concentrations of carbon monoxide, which is a flammable gas. It also contains low concentrations of hydrogen, which is flammable. A portion of the BFG produced at No. 13 Blast Furnace is burned at TBBH to generate steam for the plant. Natural gas and coke oven gas are also burned at TBBH to generate steam. No physical changes to the TBBH will be made.

The project is expected to result in an increase in the actual amount of BFG generated and an increase in the actual amount of BFG consumed at No. 13 Blast Furnace stoves. It is expected that the actual amount of BFG generated will increase by approximately 30,480 million standard cubic feet per year (MMSCF/yr). Of this increase, approximately 8,047 MMSCF/yr will be utilized at the No. 13 Blast Furnace stoves to support the increase in hot metal production. The remaining 22,433 MMSCF/yr will be burned at TBBH to generate steam or flared at blast furnace flare stacks during periods when it cannot be beneficially used at TBBH. The use of more BFG at TBBH will likely result in a decrease in natural gas consumption. However, this decrease is not included in estimates of net emissions increases attendant to the project.

2.6 Coke Plant

USS has an on-site coke plant for the production of coke used at the blast furnaces. The coke plant is currently producing at its maximum capacity and some coke requirements for the blast furnaces are currently being purchased from offsite sources. The consumption of coke will increase at No. 13 Blast Furnace as a result of the project. However, the project cannot result in an increase in coke production because of the full utilization of coke plant capacity now. The project is expected to result in an amount of coke purchased offsite equal to the increase in coke consumption at No. 13 Blast Furnace.

2.7 Sinter Plant

No physical changes will be made at the Sinter Plant. The project will not affect the production capacity of the Sinter Plant. The pellets-to-sinter ratio at No. 13 Blast Furnace depends on materials availability and costs. This will continue after the project.

2.8 84-Inch Hot Strip Mill

The cast steel slabs produced at the steelmaking shops are hot rolled to coiled steel strip (hot rolled bands) at the 84-Inch Hot Strip Mill. The slabs currently being processed at the hot strip mill come from two sources: (1) produced at the plant's two steelmaking shops and (2) received from off-site sources. The project is not expected to affect the total amount of steel slabs processed annually at the hot strip mill. The project will have the effect of decreasing the tons of slabs purchased from off-site sources. No physical changes will be made at the hot strip mill.

Table 2-1 presents the increases in production/throughput rates at the facilities included in the above discussion.

3.0 CALCULATIONS TO ESTIMATE CHANGES IN EMISSIONS OF REGULATED AIR POLLUTANTS

The No. 13 Blast Furnace Reline will result in changes in the emissions of regulated air pollutants from Gary Works. These emission changes derive from the expected increases in production/throughput rates for the facilities that are affected by the project. To estimate the changes in emissions, calculations were performed using electronic spreadsheets. Spreadsheets were set up to include each emission unit/location at each of the facilities that are affected by the project. Key variables were input for each emission unit/location. These variables are: (1) the annual production/throughput change; (2) the emission factor (uncontrolled); and (3) the capture and control efficiencies (where applicable). The emission rate changes for pollutants were calculated in units of pounds per hour and tons per year.

3.1 Criteria Air Pollutants

Emission rate changes for criteria air pollutants were calculated using the annual changes in production/throughput rates and emission factors. The annual changes in production/throughput rates were estimated using the expected increase in annual hot metal production (future potential production minus past actual production) at No. 13 Blast Furnace that will result from the project and the corresponding changes in production/throughput at the other facilities that will be affected by the project.

The project is expected to result in an increase in annual hot metal production at No. 13 Blast Furnace. The maximum annual production level after the reline is 3,650,000 tons of hot metal per year. No. 13 Blast Furnace has been operating at low hot metal production rates. This is because the present condition of the blast furnace lining restricts throughput. A reline of Blast Furnace No. 13 is scheduled to commence in June 2005 to repair the condition of the furnace. As a result of abnormally low hot metal production, it is necessary to look earlier than 2002 to determine the most recent period of representative normal hot metal production.

Figure 3-1 is a graph of monthly hot metal production at No. 13 Blast Furnace over the nine-year period January 1995 through December 2000. As shown on the figure, monthly hot metal production at No. 13 Blast Furnace dropped sharply after December 2000. The figure shows that the most recent consecutive 24 month period of representatively normal hot metal production at No. 13 Blast Furnace was the period beginning in June 1996 and ending in May 1998.

Table 3-1 shows the monthly hot metal production rates at No. 13 Blast Furnace over the most recent twenty-four month period that is representative of past actual production rates (June 1996 through May 1998). The average monthly hot metal production at No. 13 Blast Furnace during the period is 253,367 tons per month which translates to an annual representative past actual hot metal production rate of 3,040,408 tons per year. The increase in annual hot metal production attributable to the project (future potential of 3,650,000 tons/year minus past actual 3,040,408 tons/yr) is 609,592 tons/yr. The changes in production/throughput rates at other affected facilities are based on the increase in hot metal production described above. The expected changes in production/throughput rates at all of the facilities affected by the project are listed in Table 2-1.

The spreadsheets used to calculate the changes in emission rates of criteria pollutants are presented in a series of tables. Two classes of emission units are addressed: (1) process emission units (point and fugitive); and (2) combustion emission units.

To account for the full range of operational possibilities, the changes in emission rates were calculated for two operational scenarios: (1) all additional hot metal resulting from the project converted to steel at No. 1 BOP Shop; and (2) all additional hot metal converted at No. 2 Q-BOP Shop.

Tables 3-2 through 3-7 are the spreadsheets for increases in emissions of criteria air pollutants (PM_{10}, PM, SO_2, CO, NO_x, and VOC) from affected process emission units for the operating scenario where all additional hot metal is processed through No. 1 BOP Shop. Tables 3-8 through 3-13 are the spreadsheets for increases in emissions of criteria pollutants from affected combustion units for the same operating scenario. Increases in emission of lead are calculated with the hazardous air pollutants (see Section 3.2).

Tables 3-14 through 3-19 are the spreadsheets for the calculation of emission changes of criteria air pollutants from process emission units for the operating scenario when all additional hot metal is processed at No. 2 BOP Shop. Tables 3-20 through 3-25 are the spreadsheets for changes in emissions of criteria pollutants from combustion units for the same operating scenario.

3.2 Hazardous Air Pollutants

The changes in emissions of HAPs resulting from the No. 13 Blast Furnace Reline were estimated using the same method as was used to make the estimates for the Gary Works Title V permit application. The changes in annual production/throughput at each affected facility resulting from the reline project was used. The emission factors for HAPs are those derived using the results of sampling and analysis of dusts and sludges from air pollution control systems. In general, the emission factors are derived from residual materials analyses, published EPA databases, and engineering judgment.

The HAPs emitted from the process emission units affected by the project are, for the most part, metallic compounds that are constituents of particulate matter emitted from the emission units. The emission rate increases are estimated by assuming that the weight fractions of metallic HAPs in particulate matter emissions (PM_{10}) are equal to the weight fractions of metallic HAPs in the dusts and sludges removed from the exhaust gas streams. For HAPs emitted from combustion units, the EPA emission factor compilation databases were used to estimate the emissions.

A total of 55 HAPs are identified as being emitted from the facilities by the project. Appendix 3-1 presents the calculation spreadsheets for the changes in emissions of HAPs that are directly related to the project. Table 3-26 presents a summary of the calculated changes in the emissions of HAPs resulting from the project.

4.0 EMISSIONS NETTING CALCULATIONS

The determination of the applicability of Prevention of Significant Deterioration (PSD) and Non-Attainment NSR (offset) permitting requirements is based on the magnitude of the increases in emissions of regulated air pollutants attendant to the project. The portion of Lake County, Indiana in which Gary Works is located is currently classified as non-attainment (not attaining the National Ambient Air Quality Standards) for SO_2 and ozone. The area is classified as severe non-attainment for ozone against the one-hour standard and moderate non-attainment for ozone against the 8-hour standard. The area is unclassified for NO_x and CO. The area is classified as attainment for PM_{10}. For the purposes of permitting determinations, unclassified areas are considered as attainment areas.

The applicability of PSD requirements in attainment/unclassified areas and the applicability of offset requirements in non-attainment areas are determined by comparison of the emissions increases for the project to "significant emissions" thresholds shown on Table 4-1. If the calculated net increase in emissions for any pollutant exceed the thresholds, the project is classified as a major modification project subject to PSD (for attainment/unclassified pollutants) or Offset requirements (for non-attainment pollutants). The net increases in emissions for the project are determined by adding the emission changes directly resulting from the project to all other contemporaneous and creditable emissions changes at the plant. For a change to be contemporaneous, it must have been related to a project that occurred within five calendar years prior to and including the year during which construction for the subject project is expected to commence. For a change to be creditable it must be practicably enforceable (e.g., a condition in a federally enforceable permit or an emissions decrease properly creditable in accordance with the applicable federally enforceable regulation).

Tables 4-1 show the increases in emissions of criteria air pollutants attendant to the No. 13 Blast Furnace Reline Project. There are no other contemporaneous and creditable emissions changes at the plant. Table 3-26 shows the increases in emissions of hazardous air pollutants directly related to the project. Table 4-1 shows the net emissions changes for regulated air pollutants compared to the significant emissions (major source modification) threshold. As shown on Table 4-1 the net emissions increases for PM_{10}, SO_2, NO_x and CO are above significant emissions thresholds. This demonstrates that the project is subject to PSD permitting requirements specified at Indiana Rule 326 IAC 2-2 for PM_{10}, NO_x and CO and subject to the NSR-Nonattainment (offset) permitting requirements for SO_2.

The area of Lake County in which Gary Works is located has been designated as moderate non-attainment for the new 8-hour average ozone standard. Although the State Implementation Plan (SIP) rules have not yet been promulgated, it is the current policy of the Indiana Department of Environmental Management (IDEM) to treat NO_x as a precursor of ozone for permitting purposes. Therefore, the project is considered by IDEM to require emissions offsets for NO_x. This application complies with the above requirements with respect to a Best Available Control Technology Analysis, an Ambient Air Quality Analysis, Additional Impacts Analysis and specification of Emissions Offset Projects.

5.0 REVIEW OF PERTINENT REGULATIONS

The Indiana Department of Environmental Management (IDEM) and the USEPA have promulgated air quality regulations that establish ambient air quality standards and emission limits. These regulations include: (1) National Ambient Air Quality Standards (NAAQS); (2) New Source Review requirements for major sources and modifications, including Prevention of Significant Deterioration (PSD) review and non-attainment New Source Review (NSR); (3) New Source Performance Standards (NSPSs); and (4)

Maximum Achievable Control Technology (MACT) Standards. These standards and limits impose design constraints on new or modified facilities and provide the basis for an evaluation of the potential impacts of proposed projects on ambient air quality. This section briefly summarizes the pertinent regulations and explains their relevance to the project.

5.1 Ambient Air Quality Standards

The EPA established NAAQS for six air contaminants, known as criteria pollutants, for the protection of public health and welfare. These criteria pollutants are SO_2, PM_{10}, NO_2, CO, O_3, and Pb. The EPA set both primary and secondary NAAQS. Primary standards protect human health while secondary standards protect public welfare from known or anticipated adverse effects associated with the presence of air pollutants at concentrations above certain standards, such as damage to property or vegetation.

In Section 6, an air dispersion modeling evaluation is presented that demonstrates that the project complies with the NAAQS.

5.2 Prevention of Significant Deterioration (PSD)

PSD is a provision of the Clean Air Act that regulates new and existing major sources of criteria pollutants in attainment areas. PSD requirements are triggered when an entity commences construction of a new "major" source or commences construction of a "major modification" to an existing "major" source in that area. A "major modification" is subject to PSD review only if the net emissions increase of a criteria pollutant emitted by the source, as a result of the modification, is "significant." EPA has authorized the Indiana Department of Environmental Management (IDEM) to implement the PSD requirements in Indiana through a federally-approved State Implementation Plan (SIP). The Indiana SIP procedures for PSD can be found at 326 IAC 2-2. The No. 13 Blast Furnace Reline Project is subject to PSD for PM_{10} and CO.

5.3 Non-Attainment New Source Review

Non-Attainment NSR is a provision of the Clean Air Act that regulates new and existing major sources of criteria pollutants in nonattainment areas. Like PSD requirements, Non-Attainment NSR is triggered when an entity commences construction of a new "major" source or commences construction of a "major modification" to an existing "major" source in that area. A "major modification" is subject to NSR review only if the net emissions increase of a criteria pollutant emitted by the source, as a result of the modification, is "significant." EPA has authorized IDEM to implement the Non-Attainment NSR requirements in Indiana through a federally-approved SIP. The Indiana SIP procedures for Non-Attainment NSR including requirements for emissions offsets can be found at 326 IAC 2-3. The No. 13 Blast Furnace Reline Project is subject to offset requirements for SO_2 and NO_x.

5.4 New Source Performance Standards

The No. 13 BF is not subject to any NSPS. Furthermore, No. 1 BOP Shop and No. 2 Q-BOP Shop are not currently subject to the BOF NSPS (40 CFR Part 60, Subpart N and Na). No. 2 Q-BOP Shop will be subject to the BOF NSPS (Subpart Na) because of modifications to the slag skimming stations.

5.5 Maximum Achievable Control Technology (MACT)

The No. 13 Blast Furnace is not currently subject to a MACT standard, nor will the reline project trigger a MACT standard. Although the facility will be subject to a future finalized MACT standard for Integrated Iron and Steel Mills (40 CFR Part 63, Subpart FFFFF) and for Industrial, Commercial and Institutional Boilers and Process Heaters (40 CFR Part 63, Subpart DDDDD), the standards are not presently in effect. Furthermore, the facility will not trigger the "Case-by-Case" MACT Standard (40 CFR §§ 63.40-63.44; 326 IAC 2-4.1) because the project does not qualify as construction or reconstruction of a major source of hazardous air pollutants (i.e., the increase in emissions of each individual HAP is less than 10 tons/yr and the total increase of all HAPs is less than 25 tons per year).

6.0 AIR QUALITY ANALYSIS

The construction permit application for a major modification to an existing major source, such as the No. 13 Blast Furnace Reline, is required to demonstrate that the emissions increases will not cause or contribute to a violation of any applicable NAAQS or allowable PSD increments. In addition, PSD and NSR air quality evaluations require analyses of impairment to visibility, soils, and vegetation that will occur as a result of the project. An analysis of the air quality impact projected for the area as a result of general commercial, residential, industrial, and other growth associated with the project is also required.

This section describes the air quality modeling analysis, including model input parameters, model results, and an air quality impact assessment.

The results of the modeling analysis (see Section 6.4) show that the proposed project will have no significant impact on ambient air quality.

6.1 Geographic Considerations

The project is located in Gary, Indiana, in Lake County. The site is located on the southern shore of Lake Michigan, as shown in Figure 1-1. All but the northern portion of the property is surrounded by land. The northern property boundary is Lake Michigan.

A land use determination was made following the classification technique suggested by Auer (Auer, 1978) and recommended by USEPA. The classification determination was made by assessing land use categories within a 3-kilometer radius of the proposed site. The area within 3 kilometers of the site (shown in Figure 1-1) is dominated by urban characteristics. Therefore, urban dispersion coefficients were used in the air quality modeling. This is consistent with all of IDEM's air dispersion modeling conducted to date.

6.2 Applicable Standards and Allowable Increments

The Clean Air Act of 1970 was enacted by Congress to protect the health and welfare of the public from the adverse effects of air pollution. Subsequently, the EPA established the NAAQS for the criteria pollutants of SO_2, NO_2, total suspended particulates (TSP), CO, ozone (O_3), and lead (Pb). The respirable PM_{10} NAAQS were promulgated on July 1, 1987, at the Federal level replacing the TSP standards. IDEM air quality requirements for major PSD sources are based on Federal and State guidelines and Indiana regulations.

The NAAQS presented in Table 6-1 specify concentration levels for pollutants, averaged over various durations of exposure, below which the air quality is considered acceptable (with an adequate margin of safety). The NAAQS include both "primary" standards intended to protect human health and "secondary" standards intended to protect public welfare. Table 6-1 presents whichever of these standards is more stringent for each pollutant.

In order to identify those new sources or modifications with the potential to impact ambient air quality, the EPA adopted significant impact levels (SILs) for NO_2, SO_2, CO, and PM_{10} (see Table 6-1). New or modified sources that exceed the SILs require a detailed assessment of the combined impacts of the project and other existing sources. The combined impacts must demonstrate compliance with the NAAQS levels shown in Table 6-1. If the modeling results show impacts the project's net emissions increases (Level 2) are below the applicable SILs, combined impact assessment modeling (Level 3) is not required. A SIL has not been established for lead. Pursuant to IDEM policy, Level 2 or Level 3 modeling is not required if the net emissions increase for lead does not exceed the PSD significant emission rate shown on Table 6-1. The predicted lead increase is less than the PSD significant emission rates.

6.3 Air Dispersion Modeling Study

Dispersion modeling was performed for the project to determine whether the maximum off-site impacts would exceed the SILs. To assess whether the project exceeded any SILs, a refined modeling analysis was conducted using five years of meteorological data. A grid of receptors established by the IDEM Office of Air Quality for the modeling of sulfur dioxide emissions pursuant to the attainment demonstration for Lake County, Indiana was used for gaseous pollutants and the receptor grid established by IDEM for the Lake County PM_{10} attainment demonstration was used for the PM_{10} modeling. USS elected to forego screening modeling using EPA's SCREEN3 model (Level 1) and to proceed directly to refined modeling for PM_{10}, SO_2, NO_2, and CO.

Extensive air dispersion modeling of Lake County sources has been performed by USS and IDEM in support of the Lake County PM_{10} attainment demonstration and the pending Lake County SO_2 attainment demonstration/major rule change. Consequently, an air dispersion modeling baseline has been established in Lake County for PM_{10} and SO_2 that is, or will become, part of the state implementation plans (SIPs). Pursuant to guidance provided by Mark Neyman of the Office of Air Quality's Technical Support and Modeling Section, the Level 2 modeling must only include increases in PM_{10} or SO_2 emissions at emission units that would have potential emissions in excess of the levels already established in IDEM's previous air dispersion modeling for Lake County. All increases attendant to the project were included in the Level 2 modeling for CO and NO_2 as no county-wide modeling baseline has been previously established for these two parameters.

USS has previously submitted Level 3 modeling for SO_2 to aid the Office of Air Quality in preparing the major change to Rule 326 IAC 7-4-1.1(c). This Level 3 modeling was amended in support of a variance request to 326 IAC 7-4-1.1(c)(22) to allow new USS Coke Plant Boilerhouse Boiler Nos. 9 and 10 to combust coke oven gas. Sulfur dioxide emissions from emission units after the completion of the No. 13 Blast Furnace Reline Project will not exceed the levels included in the previously submitted modeling so no additional modeling was conducted. The previously submitted modeling will serve as the demonstration modeling for this application.

6.3.1 Model Selection

Refined modeling was conducted using the EPA Industrial Source Complex Short-Term (ISCST3) model (Version 02035, EPA, 2002). In accordance with the EPA's Guideline on Air Quality Models (revised) (40 CFR 51, Appendix W), this model is the most appropriate to address the proposed project for the flat terrain in the area surrounding the plant and is consistent with previous modeling conducted by the Office of Air Quality.

6.3.2 Source Modeling Parameters

Table 6-2 summarizes stack parameters for all point sources included in the modeling. Table 6-3 provides physical parameters for the modeled volume sources. Tables 6-4A thru 6-4C provide the modeled emission rates for all modeled pollutants from process and combustion units. Two different scenarios were modeled to assess the impacts of processing the increased hot metal production from Blast Furnace No. 13 through either the No. 1 BOP Shop or the No. 2 Q-BOP Shop.

The increased hot metal production and increased steel production attendant to the project are expected to result in increased truck traffic on plant roads and increased rates of outdoor materials handling operations. This is expected to result in increased emissions of fugitive dust (PM_{10}) from the primary ironmaking and steelmaking areas of the plant.

USS submitted the results of air dispersion modeling for PM_{10}, which was subsequently confirmed by OAQ, in support of the Lake County PM_{10} attainment designation and SIP revision. The fugitive dust (PM_{10}) emission rates used in the modeling for the area of the plant that will be affected by this project more than accommodates the fugitive PM_{10} emissions increases that may result from this project. As a result fugitive PM_{10} emissions from roads or outdoor material handling are not included in the Level 2 modeling.

6.3.3 Good Engineering Practice (GEP) Analysis

The EPA provides guidance on calculating a GEP stack height in the EPA document "Guidelines for Determination of Good Engineering Practice Stack Height" (EPA-450/4-80-023R, June, 1985). The calculated stack height, using these guidelines, identifies the height at which building influence on stack emissions no longer requires consideration in the modeling analysis. The GEP stack height is based on the "nearby" structure that produces the greatest calculated GEP height. A structure is "nearby" if it is within "five times the lesser of the height or the width dimension of the structure" according to the GEP Guidelines. The structure producing the GEP stack height is referred to as "controlling".

The mathematical formula for Good Engineering Practice (GEP) stack height is:

$H_g = H + 1.5L$

where:

H_g is the GEP height measured from ground level.

H is the height of the dominant nearby structure.

L is the lesser of the height or width of the nearby structure.

Building dimensions of all structures near the stacks that have an effect on dispersion were calculated using the Building Profile Input Program (BPIP), Version 95086. This data was included in the modeling input files and is the same as used by IDEM for previous modeling.

6.3.4 Receptor Locations

The receptor locations used in the modeling are the receptor locations currently being used by the Office of Air Quality for modeling associated with the PM_{10} and sulfur dioxide attainment demonstrations for Lake County, Indiana. The sulfur dioxide receptor locations were used for all gaseous pollutants. The PM_{10} receptor grid was used for the PM_{10} modeling. The receptor sets consist of discrete receptors located along property boundaries of major facilities, including USS-Gary Works, field receptors throughout Lake County and receptors at locations of particular interest to IDEM. Actual elevations for receptor locations as well as modeled emission units were used.

6.3.5 Meteorological Data

The meteorological data that was used in the refined modeling consists of five years of surface observations (1991 to 1995) collected at Hammond, Indiana, along with mixing heights derived from upper air soundings at Peoria, Illinois. These data were obtained from the IDEM Office of Air Quality. IDEM meteorological files LAKE91SO.MET, LAKE92SO.MET, LAKE93SO.MET, LAKE94SO.MET and LAKE95SO.MET were used for all gaseous pollutants. An anemometer height of 91 meters was used consistent with previous IDEM sulfur dioxide modeling. Modeling for PM_{10} was conducted using IDEM meteorological files LAKE91PM.MET, LAKE92PM.MET, LAKE93PM.MET, LAKE94PM.MET and LAKE95PM.MET with an anemometer height of 10 meters.

6.4 Modeling Results

Refined ISCST3 modeling was conducted using the meteorological data and receptor grid as discussed above. Modeling was performed using urban dispersion coefficients and ground level receptors. The ISCST3 regulatory default option was selected.

Maximum predicted concentrations for the project predicted by the Level 2 modeling are provided in Tables 6-5A thru 6-5C. For all modeled pollutants (PM_{10}, NO_2 and CO) and averaging periods, the maximum impacts are below the SILs. Therefore, additional combined impact assessment modeling is not necessary for these three pollutants. The results of the Level 3 modeling previously submitted to IDEM showed that U.S. Steel had no significant contribution to any predicted exceedance of the NAAQS for SO_2 for any averaging period.

7.0 ADDITIONAL IMPACTS ANALYSIS

Additional analyses were conducted to consider the effects of the project on visibility, soils, and vegetation, along with an analysis of secondary growth as a result of the project.

7.1 Growth

The project will require a variable number of workers during the construction phase of the modification. Once construction is completed, it is anticipated that the operation of Blast Furnace No. 13 after the reline will not require additional staff. The small number of temporary positions required during construction is not expected to significantly affect population, labor, or housing trends in the Gary area. Similarly, this number is not expected to represent an added burden to local utility services (potable water, sewer, and roadway) or social services (schools, fire, and police protection). Significant worker relocation into the area will not result from project operation.

In summary, there will be no new significant emissions from secondary growth during either operation or construction of the project.

7.2 Soils and Vegetation

The project is located in a highly urbanized and industrialized setting. Soils within the plant are primarily comprised of fill material. There are no agricultural activities or sensitive natural vegetation within the significant impact area from the project. Additionally, all modeled pollutants were below SIL concentrations or NAAQS at plant boundary receptors. Consequently, there will be no adverse impact on soils or vegetation from this project.

7.3 Visibility and Impacts on Class I Areas

The nearest Class I area to the project is Mammoth Cave National Park in Kentucky. Because this distance to the nearest Class I area is much greater than 100 kilometers, no impact analysis was required for Class I areas for this project

8.0 BEST AVAILABLE CONTROL TECHNOLOGY (BACT) AND LOWEST ACHIEVABLE EMISSION RATE (LAER) EVALUATIONS

8.1 No. 13 Blast Furnace Reline Project Emissions Overview

The increases in emissions of carbon monoxide (CO), nitrogen oxides (NO_x), particulate matter (PM_{10}), and sulfur dioxide (SO_2) resulting from the project are above the PSD/NSR significant emission rate thresholds of 100, 40, 15, and 40 tons per year, respectively. Because the facility is subject to PSD, a BACT analysis was performed for PM_{10}, SO_2, and CO. Because of the nonattainment status with respect to the 8-hour average ozone standard a BACT/LAER evaluation was performed for NOx. No other criteria pollutant emissions exceed PSD thresholds for the project. Thus, the BACT analysis presented here is limited to the before mentioned emissions resulting from the operation of No. 13 Blast Furnace after the reline.

8.2 National Ambient Air Quality Standards (NAAQS) Attainment Status

The United States Steel – Gary Works is located in Lake County, Indiana. This location is classified as either "Non-attainment" or "Unclassifiable" for all criteria pollutants except ozone. This location is classified as "Severe Non-attainment" for ozone under the 1-hour standard. EPA had previously verified the de-linkage between NOx and ozone attainment status for this area. However, the "Severe Non-attainment" designation for ozone remains linked to volatile organic compound (VOC) emissions.

The area has been classified as moderate non-attainment for the eight-hour ozone standard. Rules to revise the State Implementation Plan for the new ozone standard have not yet been promulgated. In the interim period, the Indiana Department of Environmental Management is again treating NO_x as a precursor to ozone. This also establishes the need for a BACT/LAER demonstration for NO_x

8.3 Definitions and Applicability of Best Available Control Technology (BACT) and Lowest Achievable Emission Rate (LAER)

Any "major modification" subject to PSD permitting requirements must include a BACT demonstration for all PSD/NSR pollutants for the emission units being modified.

The Clean Air Act (Section 169(3) as amended by PL 101-549) defines BACT as:

> *"An emission limitation based on the maximum degree of reduction of each pollutant subject to regulation under this Act emitted from or which results from any major emitting facility, which the permitting authority, on a case-by-case basis, taking into account energy, environmental, and economic impacts and other costs, determines is achievable for such facility through application of production, processes, and available methods, systems and techniques, including fuel cleaning, clean fuels, or treatment or innovative fuel combustion techniques for control of each such pollutant. In no event shall application of "best available control technology" result in emissions of any pollutants which will exceed the emissions allowed by any applicable standard established pursuant to section 111 (NSPS) or 112 (NESHAP) of this Act. Emissions from any*

source utilizing clean fuels, or any other means, to comply with this paragraph shall not be allowed to increase above levels that would have been required under this paragraph as it existed prior to enactment of the Clean Air Act Amendments of 1990."

The "major modification" subject to PSD permitting requirements must be evaluated to ensure the application of BACT. Determinations are made on a site-specific, case-by-case basis, with energy, economic and environmental factors all considered. Consistent with current EPA guidance, a top-down approach to BACT determination is employed in the analyses below.

During each BACT analysis, the reviewing authority evaluates the energy, environmental, economic, and other costs associated with the alternative technology, and the benefit of reduced emissions that the technology would bring. The reviewing authority then specifies an emission limitation for the source that reflects the maximum degree of reduction available for each subject pollutant regulated under the Act. In no event can a technology be recommended which would not meet any applicable standard of performance under 40 CFR Parts 60 (New Source Performance Standards) and Parts 61 and 63 (National Emission Standards for Hazardous Air Pollutants).

8.4 Top-Down BACT Analysis

The most commonly used approach to an acceptable BACT determination is called the "Top-Down BACT" approach because it ranks all technically feasible control approaches in descending order of control effectiveness prior to detailed analysis. The most stringent control option is evaluated first and is established as BACT unless it is rejected due to technical, energy, environmental, or economic considerations. If the most stringent option is eliminated in this manner, the next most stringent option is evaluated. Technology transfers are not generally accountable as BACT. This process continues only until a control option is not eliminated due to any of the above considerations. The un-eliminated (surviving) control option is established as BACT for the subject application. The EPA issued draft guidance for top-down BACT analyses on March 15, 1990. This guidance manual is the basis of the assessment procedures used below.

The Clean Air Act (Section 171(3) as amended by PL101-549) defines LAER as:

> *"That rate of emissions which reflects (A) the most stringent emission limitation which is contained in the implementation plan of any State for such class or category of source, unless the owner or operator of the proposed source demonstrates that such limitations are not achievable, or (B) the most stringent emission limitation which is achieved in practice by such class or category of source, whichever is more stringent. In no event shall the application of this term permit a proposed new or modified source to emit any pollutant in excess of the amount allowable under applicable new source standards of performance."*

A LAER evaluation is similar to a BACT evaluation with the added feature that a review of emission limits for the same category of source (e.g., blast furnace) is performed. A review of the RACT/BACT/LAER clearinhouse did not reveal any NO_x emission limits imposed on blast furnaces. Therefore a BACT Analysis was performed for NO_x to satisfy LAER requirements.

8.5 BACT for Carbon Monoxide

8.5.1 Blast Furnace Casthouse and Slag Pit

8.5.1.1 Formation and Release Mechanisms

Carbon monoxide (CO) is formed inside of the blast furnace during the reaction of coke and other carbon-bearing input materials with the hot blast air. Almost all of the CO formed during smelting process is consumed in reducing the iron oxide in the burden to elemental molten iron or reports to the blast furnace gas which is a by-product of the smelting process.

A small amount of the CO formed inside of the furnace is dissolved in solution with the molten iron and molten slag in the furnace. Some of the dissolved CO is liberated from the molten streams when iron and slag flow from the furnace into ambient air during casting operations.

8.5.1.2 Listing of Technologies

There is no known available control technologies that can be applied to control the small amounts of CO liberated from molten iron and slag during casting operations. Any capture systems on the casthouse and at the slag pit would require high volumes of exhaust air which would significantly dilute the small amounts of CO emitted to concentrations below the minimum limits for currently available thermal combustion/oxidization technologies for control of flammable gas pollutants. In addition, the particulate matter and the heavy metals in the particulate matter emitted from the iron runners, slag runners and slag pit preclude use of catalytic oxidation technologies.

There are no known CO emissions control devices at any blast furnace casthouse and slag pit on the earth.

8.5.1.3 Selection of BACT for CO

Based on the fact that there on no known CO controls for the small amounts of CO emitted from the casthouse and slag pit, it is concluded that BACT is the current configuration and practice at No. 13 Blast Fumace.

8.5.2 Blast Furnace Stoves

8.5.2.1 Formation and Release Mechanisms

A major portion of the CO formed in the blast furnace exists in the furnace as the major constituent of blast furnace gas (BFG) a by-product fuel gas formed during the smelting process. The BFG is collected near the top of the blast furnace and ducted under pressure to a gas cleaning system (dust catchers and scrubbers) where particulate matter is removed from the gas stream. The BFG contains approximately 27 percent CO and approximately one percent hydrogen (volume percents). The presence of these two flammable gases in a gas with approximately 72 percent non-flammable gases gives BFG a gross heating value approximately between 85 and 100 BTUs per standard cubic foot. For this reason, BFG is used as a by-product fuel in the steel industry. The excess BFG not beneficially used as a fuel is burned at flare stacks before being discharged to the atmosphere.

8.5.2.2 Listing of Technologies

Several technologies are available for the control of CO emissions by oxidation. The potentially applicable technologies are shown in Table 8-1. All of the technologies convert CO to CO_2 at efficiencies in excess of 98%. Table 8-2 lists CO control options identified from EPA's BACT/LAER Clearinghouse from iron and steel making permits.

8.5.2.3 Selection of BACT

At Gary Works all BFG produced from iron making is burned in air either beneficially as a fuel or wasted at the BGF flare stacks. Considering the above, the current operations and the resulting CO emissions should be considered as BACT.

8.6 BACT for Sulfur Dioxide

8.6.1 Blast Furnace Casthouse and Slag Pit

8.6.1.1 Formation and Release Mechanisms

The raw materials that are charged into No. 13 Blast Furnace contain sulfur as intrinsic sulfur compounds. The largest contributors to the total sulfur input to the furnace are coal, coke and BOP slag. The molten iron produced in the blast furnace must have a limited sulfur content. Sulfur is removed from molten iron to meet specifications by introducing fluxing agents (e.g., calcium lime and dolometic lime) which react with sulfur and other undesired elements in molten iron to form a slag which floats on top of the molten metal. Not all of the sulfur is removed from the hot metal in the blast furnace. Some very small amount of the elemental sulfur in the molten iron is burned at the surface of the molten iron when it is cast from the furnace to form SO_2.

The sulfur in molten blast furnace slag is in the forms of sulfates, sulfites and sulfides. Some of the sulfur in slag is in the form of gaseous hydrogen sulfide (H_2S) described in the molten slag solution. When the molten slag exits the furnace, the dissolved H_2S is liberated from the solution and some of the H_2S burns at the interface between the molten slag and air to form SO_2.

The SO_2 emitted at the casthouse, emanates from the taphole, the iron trough, the slag runners and the iron runners. These emission points are mostly controlled for particulate matter by the casthouse fume collection and control system. Therefore, most of the SO_2 formed and emitted at the casthouse is captured and emitted through the PM_{10} emission control system baghouse stack.

The SO_2 emitted at the slag pit emanates from the slag fall from the casthouse to the slag pit and from the molten slag prior to solidifcation.

8.6.1.2 Listing of Technologies

Discussions with air pollution control equipment vendors revealed three "end-of-pipe" technologies for SO_2 control for possible consideration for application to the blast furnace casthouse.

1. Wet Scrubber.
2. Dry Sorbent Reactor Process.
3. Spray Dryer Process.

Wet Scrubber

In the wet scrubber system, the waste gas containing SO_2 is passed through the absorber section where it makes contact with an acid absorbent/neutralizing solution or slurry. The acidic SO_2 is neutralized/absorbed to form sulfate salt which is removed as a sludge/slurry, dewatered and disposed of.

Dry Sorbent Reactor Process

In the dry sorbent reactor process, the waste gas is first passed through a large reaction chamber which is located upstream of a fabric filter baghouse. A dry absorbent is injected into the gas stream before it enters the reaction chamber. The dry absorbent absorbs/neutralizes acid gas (SO_2) onto the solid absorbent. The gas stream with the absorbent is passed from the reaction chamber into the fabric filter baghouse. The particulate matter in the gas stream and the dry absorbent material forms a cake on the filter fabric. As the gas passes through the cake on the fabric filter, additional absorption/neutralization of SO_2 takes place.

Spray Dryer Process

In the spray dryer process, an alkaline slurry or solution is atomized into the waste gas stream in a spray dryer absorber. The atomized droplets absorb SO_2 and the heat in the waste gas evaporates the water from the slurry or solution droplets to form a suspension of solid absorbent media in the gas stream. The solids and particulate matter form a cake on the fabric filter in the baghouse. As the gas passes through the cake, additional absorption/neutralization of SO_2 takes place.

8.6.1.3 Evaluation of Technologies

Wet Scrubber

The application of a wet scrubber system at No. 13 Blast Furnace Casthouse is precluded by wastewater discharge permitting considerations. The Gary Works National Pollutant Discharge Elimination System (NPDES) wastewater discharge permit has been stayed for an unknown period of time. This means that no new sources of wastewater discharges can be permitted until a new NPDES Permit is issued.

Dry Sorbent Reactor Process

The No. 13 Blast Furnace Casthouse Emissions Control System has a mass cooler installed upstream of the baghouse. This cooler consists of a series of heavy steel plates suspended at a specified spacing in the hot waste gas stream exhausted from the casthouse. When casting operations are occurring, heat is transferred by convection from the gas to the plates thus reducing the temperature of the gas to levels that will not damage the bags in the baghouse. When casting operations are not occurring, heat is transferred by convection and radiation from the plates to the surroundings which lowers the temperature of the plates to receive heat again. The mass cooler is a critical part of the emissions control system.

The designer/builder of the emissions control system cautions that a sorbent injection system should not be installed upstream of the mass cooler. The injection of the material at that location would result in the plugging of the spaces between the plates; coating and corroding the plates; and significantly reducing the capacity for heat transfer. This requires the injection of absorbent downstream of the mass cooler and upstream of the existing baghouse. The area between the mass cooler and the baghouse is severely restricted with respect to space. The dry sorbent reactor process

would require a cylindrical reaction chamber (tower) 22 feet in diameter and 120 feet high. There is not sufficient space to install the reactor. Therefore, the application of the dry sorbent process at the No. 13 Blast Furnace Casthouse is considered to be technically infeasible.

Spray Dryer Process

The technical infeasibility of the dry sorbent reactor process and the preclusion of a wet scrubber, leaves the spray dryer process for consideration. Again, the absorbent must be directly injected into the duct between the mass cooler and the baghouse. This is a short run of duct with a low gas residence time for the absorbing/neutralizing reaction to occur. In addition, the gas temperature downstream of the cooler is approximately 250°F, which is too low for efficient SO_2 removal, and the concentrations of SO_2 in the gas are low compared to other locations where the technology is applied.

The combination of the above factors will result in very low SO_2 removal efficiency, estimated to be no higher than 40 percent.

The rough budgetary capital cost estimate for the installation of the lime handling system is $500,000. The system would require approximately one ton of lime injectant per hour at a cost of approximately $100 per ton of lime.. The additional lime will increase the amount of baghouse dust that must be disposed of at a hazardous waste landfill. Table 8-3 presents a budgetary estimate of annualized cost for a spray dryer process with respect to expected SO_2 abatement. As shown on the table, the abatement cost exceeds $10,000 per ton of SO_2 abated. Considering that the results of the Ambient Air Quality Analysis demonstrate compliance with the NAAQS for SO_2 without casthouse SO_2 emissions control at No. 13 Blast Furnace, this abatement cost is excessive.

8.6.1.4 Selection of BACT

There are no blast furnaces in the United States with SO_2 controls for casthouses and slag pits. The only identified potentially applicable technology (Spray Dryer Process) would result in a low SO_2 removal efficiency (40%) and an extremely high SO_2 abatement cost. Therefore, BACT is considered to be the current operation at No. 13 Blast Furnace.

8.6.2 Blast Furnace Stoves

8.6.2.1 Formation and Release Mechanisms

Some of the sulfur removed from the hot metal during the blast furnace smelting process reports to BFG as trace gaseous components of BFG. The sulfur in the gas is primarily in the form of hydrogen sulfide (H_2S) with lesser amounts of carbonyl sulfide (COS) and carbon disulfide (CS_2). When the BFG is burned, the sulfur containing gases are oxidized to SO_2 and water. The SO_2 is emitted with other products of BFG combustion.

8.6.2.2 Listing of Technologies

Potentially applicable SO_2 control technologies are the same flue gas desulfurization technologies identified above for the casthouse and slag pit. The application of any of the technologies would require gas cooling upstream of the control devices. There are no known blast furnace stove installations in the world equipped with SO_2 controls. This is because the typical concentrations of SO_2 in the flue gas (approximately 10 ppmv at No. 13 Blast Furnace) are lower then the effective range for the technologies.

8.7 BACT/LAER for Oxides of Nitrogen

8.7.1 Blast Furnace Casthouse and Slag Pits

8.7.1.1 Formation and Release Mechanisms

Oxides of nitrogen (NO_x) are formed at the casthouse and slag pits when nitrogen and oxygen in air comes in contact with the high temperature molten iron and molten slag streams flowing and falling at the casthouse and slag pit, the formation and emission of NO_x is incidental to the casting process and, therefore, emissions of NO_x are low from the casthouse and slag pit.

8.7.1.2 Listing of Technologies

There are no technologies installed at any blast furnace in the world for NO_x emissions control. Any of the technologies discussed below for the control of NO_x from fuel combustion units are not applicable to the blast furnace casthouse and slag pit emissions because of extremely low concentrations of NO_x in captured gases and the fouling potential of any of the catalyst based technologies due to particulate matter and metallic constituents of particulate matter in the emissions streams.

8.7.1.3 Selection of BACT/LAER

Control technologies for NO_x are not applicable to the low emissions of NO_x from blast furnace casthouses and slag pits. Such technologies have never been employed for control of NO_x emissions from these locations. As such, attempted applications would be technology transfers that need not be accountable as BACT.

8.7.2 Blast Furnace Stoves

8.7.2.1 Formation and Release Mechanisms

Oxides of nitrogen are formed when fuel (BFG and natural gas) are burned at the blast furnace stoves. In the vicinity of the combustion flame, the high temperatures facilitate the combining of the nitrogen and oxygen in the combustion air and in the air in the vicinity of the flame to form NO_x. In addition, some of the nitrogen, as a component in blast furnace gas, contributes to the formation of NO_x at the flame.

8.7.2.2 Listing of Technologies

There are various "end-of-pipe" NO_x control technologies that have been applied to steady-state, clean flue gas combustion processes. These are:

Selective Catalytic Reduction (SCR)
Selective Non-Catalytic Reduction (SNCR)
Non-Selective Catalytic Reduction (NSCR)

These technologies are commercially available and, in steady state, clean flue gas applications (natural gas fired boilers; gas turbines and gas fired process heaters NO_x

removal efficiencies of 80 to 90 percent have been achieved. These technologies have never been employed at blast furnace stoves. The level of particulate loading in blast furnace gas supplied to the stoves is a preclusive concern with respect to potential fouling of catalyst beds.

There are various technologies for reduction of NO_x from combustion units that are based on reducing flame temperature or reducing the nitrogen concentrations in gases near the flame. These are:

Low excess air (LEA)
Overfire air (OFA)
Burners out of service (BOOS)
Reduced combustion air temperature (RCAT)
Flue gas recirculation (FGR)
Low-NO_x and Ultra Low-NO_x burners

8.7.2.3 Evaluation of Technologies

Low Excess Air

The LEA process is typically used in conjunction with some of the other options. It is a combustion technique in which NO_x formation is inhibited by reducing the excess air to well under normal levels. The use of this method at blast furnace stoves would reduce the oxidation of CO in the BFG and increase CO emissions from the combustion of natural gas thus increasing CO emissions. The LEA process would not be effective for blast furnace stoves because excess air is currently only at 10% of stoichiometric air requirements.

Overfire Air

The OFA process is a technique to reduce NO_x emissions by carrying out initial combustion in a primary, fuel-rich combustion zone and completing the combustion at a lower temperature in a second, fuel-lean zone. Using OAF, burners are fired more fuel-rich than normal, with additional air added through overfire air ports, or an idle top row of burners. OFA is generally implemented on large, utility-scale boilers and less readily applied to furnaces. This technique has not been used on blast furnace stoves. Thus, the OFA method is precluded from further consideration in this BACT analysis.

Burners Out of Service

The BOOS firing option is another technique which carries out initial combustion in a primary, fuel-rich combustion zone and completes combustion in a second, fuel-lean zone, thereby reducing the formation of NO_x. With BOOS firing, selected burners and/or rows of burners are taken out of service, but allowed to introduce air into combustion zone. Thus, the total fuel demand of the stove is supplied by remaining active burners. This is not applicable to blast furnace stoves each stove has only one burner. BOOS firing is precluded from further consideration in the BACT analysis.

Reduced Combustion Air Temperature

The RCAT option inhibits thermal NO_x production. This method is limited to combustion systems which employ combustion air pre-heating. Since the stove combustion air is not preheated, this system is precluded from further consideration in this BACT analysis.

Flue Gas Recirculation

The FGR option involves recycling a portion of the cooled exit flue gas back into the primary combustion zone. Typically, FGR reduces thermal NO_x formation by introducing inert products into the combustion zone, resulting in a lower flame temperature. Additionally, FGR reduces thermal NO_x production by lowering oxygen concentration in the combustion zone. A major limitation of FGR is that it would lower the heating efficiency of the stoves. This system would slow the heat input into the checker brick and lengthen the heating cycle, thus slowing the production rate of the blast furnace. Thus, the FGR method is precluded from further consideration in this BACT analysis.

Low NO_x and Ultra Low-NO_x Burners

Most of the NO_x emitted from the No. 13 Blast Furnace Stoves results from the combustion of natural gas. Approximately 5% of the heat input to the burner is derived from natural gas combustion. Approximately 93% of the NO_x is estimated to come from natural gas combustion and 7% from the combustion of BFG. Consideration of NO_x controls for the blast furnace stoves should focus on natural gas combustion. Each stove is equipped with a vertically fired ceramic burner. At the fuel mix, the calculated NO_x concentration in the stack gas is less than 100 ppm for the burners at the stove at No. 13 Blast Furnace. The EPA NO_x emission factor for natural gas for large conventional fuel/air burners is 280 lbs. NO_x/MMSCF. This translates to approximately 200 ppm NO_x in stack gas. Therefore, the burners installed at the stoves are considered low-NO_x burners for the combustion of natural gas and blast furnace gas.

8.7.2.4 Selection of BACT/LAER

Both the end-of-pipe control options and the combustion modification control options, exclusive of Low-NO_x burners, have never been installed on blast furnace stoves. Therefore, they are unproven technology transfers. The burners currently installed on the stoves perform as Low-NO_x burners and are considered to be BACT/LAER for NO_x emissions from blast furnace stoves.

8.8 BACT for Particulate Matter

8.8.1 Blast Furnace Casthouse

8.8.1.1 Formation and Release Mechanisms

Particulate matter is formed at the blast furnace casthouse during casting operations. When the furnace is tapped molten iron flows through the taphole into an iron trough. The exposure of the molten iron stream to air results in the formation of iron oxide fume near the surface of the molten metal. The fine fume particles form in the air and remain airbome. The molten iron contains carbon in a solution. As the molten iron at the surface of the stream cools some of the iron comes out of solution as small graphitic carbon flakes (kish) which remain airborne.

As molten slag flows from the furnace, fumes and dusts are formed at the interface of the slag stream with air. These particles remain airborne.

8.8.1.2 Listing of Technologies

Particulate matter emission control systems have been installed at blast furnace casthouses for several decades. These systems can be classified in two broad categories:

1. Total Casthouse Evacuation Systems.
2. Close-Capture, Local Exhaust Systems.

Both systems exhaust fumes and dust emitted inside the casthouse to a gas cleaning system, normally a fabric filter baghouse.

Total Casthouse Evauation Systems

These systems allow the particulate emissions to emanate from the taphole, iron trough, iron runners, drops to torpedo ladles and slag runners into the casthouse interior. The emissions rise to the roof monitor in the casthouse due to heat release and thermal buoyancy. These systems employ large canopy hoods at the truss level of the casthouse building to capture the rising emissions, which are ducted to the gas cleaning baghouse for removal of particulate matter.

Close Capture Local Exhaust Systems

These systems employ close-capture local exhaust hoods/covers at the locations of fume/dust generation (e.g., taphole, iron trough iron runners, and slag runners). The hoods are ducted to the gas cleaning system baghouse. In general, close-capture, local exshaust systems provide better cvapture efficiencies than do total casthouse evacuation systems.

The PM_{10} emissions control system currently employed at No. 13 Blast Furnace is a close-capture, local exhaust ventilation system with hoods at the tapholes, iron troughs and parts of the iron runners. As part of the No. 13 Blast Furnace Reline Project, improvements to the local exhaust system will be made in the form of more effective covers at iron troughs and iron runners. This is expected to improve the fume/dust capture efficiency of the system, thus reducing fugitive emissions of particulate matter. With respect to capture, the system will be state of the art for blast furnace casthouse emissions control.

8.8.1.3 Evaluation of Technologies

With respect to baghouse PM_{10} removal efficiency, the baghouse is currently equipped with 5,472 polyester bags. The replacement of these bags with Gortex® bags can result in an improvement in front-half catch PM_{10} removal efficiency. The supplier's front-half PM_{10} concentration guarantees for Polyester bags and Gortex® bags for the No. 13 Blast Furnace Casthouse baghouse are as follows:

Polyester	0.005 grains/acf
Gortex®	0.001 grains/acf

For reference, stack tests conducted in 1995 and 1996 yielded an average front-half grain loading of 0.004 grains/dscf at the baghouse stack.

Table 8-4 presents an analysis of the annual abatement costs in dollars per ton of PM_{10} abated for the replacement of the Polyester bags with Gortex® bags. As shown on the table the estimated abatement cost is less than $150 per ton of PM_{10} emissions from the No. 13 Blast Furnace Casthouse.

8.8.1.4 Selection of BACT

Considering the above, BACT for the emissions of PM_{10} from the No. 13 Blast Furnace is the use of Gortex® bags in the No. 13 Blast Furnace PM_{10} Emissions Control Baghouse.

8.8.2 Slag Pit

8.8.2.1 Formation and Release Mechanisms

As molten slag flows from the slag runners on the casthouse floor and falls into the slag pit, fumes and dusts are formed at the interface of the turbulent slag stream and air.

These particles which consist primarily of oxides and sulfates become airborne and are emitted into the air as particulate matter.

8.8.2.2 Listing of Technologies

The only technology currently at blast furnaces in the United States for control of PM_{10} emissions from blast furnace slag pits is the application of water sprays for the slag that has entered the slag pit. The application of water in the slag pits is also done to cool the slag to enable removal by large earth moving equipment.

A technique that has been employed for small air-cooled slag pits at electric arc furnace shops is to enclose the slagging operations in a building and exhaust the building to a dry dust collector (baghouse). This technique is not practical for the No. 13 Blast Furnace slag pits for several reasons. First the size of the slag pit would require a very large building. Second, because water is used to cool the slag for removal, the large volumes of steam would require a wet gas cleaning system (scrubber) which cannot be applied at Gary Works due to current wastewater discharge restrictions. Third, the corrosive nature of the wet steam would necessitate frequent rebuilding of the structure and enclosing sheeting. These factors render an evacuated enclosure technically and economically infeasible.

In recent years, a market has developed for granulated blast furnace slag. In the granulation process, the molten slag falls from the slag runner onto a rotating drum. A high pressure stream of water is sprayed onto the molten slag stream as it impacts the rotating drum. The mechanical energy of the impact with the drum and the impact with the water stream disperses the molten slag stream into droplets, which are cooled by the water to solidify into slag granules.

Several tests have been conducted to assess the impact of slag granulation on the emissions of criteria pollutants. The tests were conducted for total particulate matter at Wierton Steel and for particulate matter, sulfur dioxide, and oxides of nitrogen at the Lafarge slag granulator at No. 7 Blast Furnace at the Ispat – Inland East Chicago, Indiana Plant. The testing indicates that slag granulation reduces particulate matter emissions by about 50 percent as compared to conventional casting of slag into the slag pit. The Lafarge tests also show substantial reductions in emissions of SO_2 and NO_x (See discussion of impacts of slag granulation in Section 8.9).

8.8.2.3 Selection on BACT

Based on the above, it is concluded that the application of water sprays for conventional slag casting and slag granulation is BACT for PM_{10}.

8.8.3 Blast Furnace Stoves

8.8.3.1 Formation and Release Mechanisms

The major flammable components of BFG are carbon monoxide and hydrogen. Almost no particulate matter is formed as a result of the combustion process. There is, however, particulate matter that is entrained in the BFG that is burned in the stoves. The residual particulate matter is not affected by the combustion process and is emitted from the BFG combustion unit with the products of combustion.

8.8.3.2 Listing of Technologies

The source of the residual particulate matter are the fumes and dust that are entrained in the "dirty BFG" that exists in the blast furnace top as a product of the smelting process. Before the "dirty gas" can be used as a fuel, it must be cooled and cleaned. This is done by first removing large particles from the gas stream by inertial and gravitational separation in a dust catcher. From the dust catcher, the gas enters a gas cooler and wet scrubber in series, which cools and cleans the gas stream. The efficiency of the gas cleaning process determines the amount of residual particulate matter entrained in the BFG and, in turn, the PM_{10} emission rate from BFG combustion.

As part of the No. 13 Blast Furnace Reline Project, significant improvements to the BFG gas cleaning systems will be made. The scrubber system technology will be changed to improve gas cleaning efficiency. This is expected to result in a significant reduction in the particulate matter loading of the BFG burned in the stoves and at the boiler house.

There are no known end of pipe PM_{10} control technologies installed at any blast furnace stove system in the world. Therefore, all such controls are considered to be unproven technology transfers that need not be considered as BACT.

8.8.3.3 Selection of BACT

Based on the above, it is concluded that the planned improvements to the No. 13 Blast Furnace gas cleaning system should be considered BACT for control of PM_{10} emissions for the blast furnace stoves.

8.9 Application of Slag Granulation for Control of PM_{10}, SO2, and NOx Emissions from Slag Pits.

As discussed in Section 8.8.2.2 above, the available test data indicate that slag granulation results in significant reductions in the emissions of PM_{10}, SO_2, and NO_x compared to conventional casting of slag into slag pits. A major fraction of the slag generated at No. 13 Blast Furnace is granulated at the slag granulator located at No. 13 Blast Furnace Slag Pit.

The estimates of emission rates of criteria air pollutants and the ambient air quality analyses presented in the application are based on a minimum of 75 percent of the slag generated at No. 13 Blast Furnace during a year being processed through the slag granulator and 25 percent of the slag being conventionally cast into the slag pit. Table 8-5 presents the emission factors for the three pollutants with and without slag granulation and the estimated emissions reduction efficiency at the 75 percent annual granulation minimum, assuming a linear relationship between emission factor and percent of slag granulated. It is proposed to establish a condition in the construction/operation permit (significant modification of the Part 70 Permit) that the minimum slag granulation rate after the project be 75 percent of the total slag generation at No. 13 Blast Furnace during any rolling 12-month period. This should be recognized as satisfying BACT requirements for PM_{10}, SO_2 and NO_x requirements at the slag pit.

9.0 EMISSION OFFSETS

The estimated increase in the emissions of SO_2 resulting from the project is 209 tons per year. This is in excess of the significant emissions increase threshold of 40 tons per year. The estimated increase in emissions of NO_x resulting from the project is 83 tons per year. This is in excess of the significant emissions increase threshold of 40 tons per year. Because the increase in SO_2 emissions exceeds the threshold, the entire increase must be offset by a reduction in actual plant-wide SO_2 emissions at a weight ratio of greater than one to one in accordance with Indiana Rule 326 IAC 20303 (a)(4).

IDEM is currently treating NO_x as a precursor to ozone with respect to the new 8-hour average ozone air quality standard. Because the estimated increase in NO_x emissions exceeds 40 tons per year in a moderate nonattainment area, IDEM currently requires the NO_x emissions increase to be offset by a reduction in actual plant-wide NO_x emissions at a weight ratio of 1.15 to one. The required offsets are as follows:

Sulfur Dioxide (SO_2)	220 tons/yr
Oxides of Nitrogen (NO_x)	96 tons/yr

The required offsets will be realized by the purchase of offset credits that are available in the airshed. Appropriate paperwork documenting the creditability of the offsets and the purchase will be submitted to IDEM subsequent to the purchase.

10.0 CONSTRUCTION PERMIT APPLICATION FORMS

Appendix 10-1 presents the appropriate IDEM construction permit application forms treating the No. 13 Blast Furnace Reline Project as a request for a major modification of a Part 70 permitted source.

US STEEL GARY WORKS
CONSTRUCTION PERMIT APPLICATION
BLAST FURNACE NO.13 RELINE
CHANGE IN EMISSION RATES
NO. 13 BLAST FURNACE FUTURE HOT METAL PRODUCTION RATE (TONS/DAY):
8,378
All Additional Hot Metal Through the #1 BOP

Emission Unit	Emission Location	Changes in Annual Emission Rates of Criteria Air Pollutants											
		PM_{10}		PM		SO_2		CO		NO_X		VOC	
		tons/yr	lbs/hr	tons/yr	lbs/hr	tons/yr	lbs/hr	tons/yr	lbs/hr	tons/yr	lbs/hr	tons/yr	lbs/hr
Blast Furnace No.13	Casthouse Baghouse	0.1463	0.0334	0.0000	0.0000	2.8976	0.6616	0.0000	0.0000	0.2181	0.0498	0.0000	0.0000
	Casthouse Baghouse (Roof Monitor)	0.0016	0.0004	0.0032	0.0007	0.0058	0.0013	0.0000	0.0000	0.0004	0.0001	0.0000	0.0000
	Slag Pit Operations	0.5942	0.1357	0.8728	0.1993	1.0102	0.2307	0.1779	0.0406	0.0465	0.0106	0.0044	0.0010
	Stoves (NG)	0.0280	0.0064	0.0280	0.0064	0.0022	0.0005	0.3090	0.0705	1.0300	0.2352	0.0202	0.0046
	Stoves (BFG)	0.1117	0.0255	0.3374	0.0770	0.7434	0.1697	3.0829	0.7039	0.0710	0.0162	0.0000	0.0000
	Blast Furnace No. 13 Total	0.8818	0.2013	1.2413	0.2834	4.6593	1.0638	3.5699	0.8150	1.3660	0.3119	0.0246	0.0056
TBBH Boilers	TBBH Boilers (BFG)	0.3114	0.0711	0.9406	0.2147	2.0725	0.4732	8.5950	1.9623	0.1978	0.0452	0.0000	0.0000
PCI	Coal Pulverizer Bldg.	0.0093	0.0021	0.0106	0.0024	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	PCI Total	0.0093	0.0021	0.0106	0.0024	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
No. 1 BOP	Gas Cleaning Systems	0.2523	0.0576	0.3823	0.0873	0.0000	0.0000	80.6193	18.4062	0.8272	0.1889	0.0207	0.0047
	Gas Cleaning Systems (Roof Monitor)	0.2125	0.0485	0.3219	0.0735	0.0000	0.0000	4.0065	0.9147	0.0023	0.0005	0.0001	0.0000
	Hot Metal Desulf Baghouse	0.2856	0.0652	0.2856	0.0652	0.4341	0.0991	0.0000	0.0000	0.0208	0.0048	0.0087	0.0020
	Hot Metal Desulf Baghouse (Roof Monitor)	0.0344	0.0078	0.1441	0.0329	0.0066	0.0015	0.0000	0.0000	0.0003	0.0001	0.0001	0.0000
	Continuous Casting	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.0000	0.0000
	CAS Bell Baghouse	0.0971	0.0222	0.0971	0.0222	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	CAS Bell Baghouse (Roof Monitor)	0.0100	0.0023	0.0100	0.0023	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	Flux Handling Baghouse	0.0366	0.0083	0.0366	0.0083	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	Flux Handling Baghouse (Roof Monitor)	0.0003	0.0001	0.0006	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	No. 1 BOP Total	0.9286	0.2120	1.2780	0.2918	0.4407	0.1006	84.6259	19.3210	0.8507	0.1942	0.0296	0.0067
No. 1 BOP Caster	Fugitives (Roof Monitor)	0.0128	0.0029	0.0435	0.0099	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
No. 2 Q-BOP	Gas Cleaning Systems	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	Gas Cleaning Systems (Roof Monitor)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	Hot Metal Desulf Baghouse	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	Hot Metal Desulf Baghouse (Roof Monitor)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	Continuous Casting	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.0000	0.0000
	Secondary Emissions Baghouse	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	116' Elevation North and South Flux Handling System Baghouses	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	116' Elevation North and South Flux Handling System Baghouses (Roof Monitor)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	North Roof Baghouse (166')	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	North Roof Baghouse (166') (Roof Monitor)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	South Roof Baghouse (166')	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	South Roof Baghouse (166') (Roof Monitor)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	Middle Roof Baghouse (166')	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	Middle Roof Baghouse (166') (Roof	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	Day Tank Lime Silo Baghouse	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	Day Tank Lime Silo Baghouse (Roof	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	Lime Dump Station Baghouse	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	Lime Dume Station Baghouse (Roof	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

US STEEL GARY WORKS
CONSTRUCTION PERMIT APPLICATION
BLAST FURNACE NO.13 RELINE
CHANGE IN EMISSION RATES
NO. 13 BLAST FURNACE FUTURE HOT METAL PRODUCTION RATE (TONS/DAY):
8,378
All Additional Hot Metal Through the #1 BOP

Emission Unit	Emission Location	Changes in Annual Emission Rates of Criteria Air Pollutants											
		PM_{10}		PM		SO_2		CO		NO_X		VOC	
No. 2 Q-BOP	No. 1 Hot Fume Exhaust Baghouse	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	No. 1 Hot Fume Exhaust Baghouse (Roof Monitor)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	No. 2 Hot Fume Exhaust Baghouse	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	No. 2 Hot Fume Exhaust Baghouse (Roof Monitor)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	No. 1&2 Material Handling System	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	No. 1 & 2 Material Handling System (Roof Monitor)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	No. 3 LMF Hot Fume Extraction Exhaust/ Material Handling System	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	No. 3 LMF Hot Fume Extraction Exhaust/ Material Handling System (Roof Monitor)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	No. 3 LMF Material Handling System	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	No. 3 LMF Material Handling System (Roof Monitor)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	RH Vacuum Degasser Slag Conditioning Baghouse	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	RH Vacuum Degasser Slag Conditioning Baghouse (Roof Monitor)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	No. 2 Q-BOP Total	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
No. 2 Q-BOP Caster	Fugitives (Roof Monitor)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

OVERALL TOTAL												
OVERALL TOTAL	2.144	0.4894	3.5141	0.8023	7.1724	1.6375	96.7907	22.0983	2.4145	0.5513	0.0542	0.0124

US STEEL GARY WORKS
CONSTRUCTION PERMIT APPLICATION
BLAST FURNACE NO.13 RELINE
CHANGE IN EMISSION RATES
NO. 13 BLAST FURNACE FUTURE HOT METAL PRODUCTION RATE (TONS/DAY):
8,378
All Additional Hot Metal Through The No. 1 BOP

Emission Unit	Emission Location	Changes in Annual Emission Rates of Criteria Air Pollutants											
		PM_{10}		PM		SO_2		CO		NO_X		VOC	
		tons/yr	lbs/hr	tons/yr	lbs/hr	tons/yr	lbs/hr	tons/yr	lbs/hr	tons/yr	lbs/hr	tons/yr	lbs/hr
Blast Furnace No.13	Casthouse Baghouse	0.1479	0.0338	0.0032	0.0007	2.9034	0.6629	0.0000	0.0000	0.2186	0.0499	0.0000	0.0000
	Slag Pit Operations	0.5942	0.1357	0.8728	0.1993	1.0102	0.2307	0.1779	0.0406	0.0465	0.0106	0.0044	0.0010
	Stoves (NG)	0.0280	0.0064	0.0280	0.0064	0.0022	0.0005	0.3090	0.0705	1.0300	0.2352	0.0202	0.0046
	Stoves (BFG)	0.1117	0.0255	0.3374	0.0770	0.7434	0.1697	3.0829	0.7039	0.0710	0.0162	0.0000	0.0000
	Blast Furnace No. 13 Total	**0.8818**	**0.2013**	**1.2413**	**0.2834**	**4.6593**	**1.0638**	**3.5699**	**0.8150**	**1.3660**	**0.3119**	**0.0246**	**0.0056**
TBBH Boilers	TBBH Boilers (BFG)	0.3114	0.0711	0.9406	0.2147	2.0725	0.4732	8.5950	1.9623	0.1978	0.0452	0.0000	0.0000
PCI	Coal Pulverizer Baghouse	0.0093	0.0021	0.0106	0.0024	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	PCI Total	**0.0093**	**0.0021**	**0.0106**	**0.0024**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**
	Gas Cleaning Systems	**0.4648**	**0.1061**	**0.7042**	**0.1608**	**0.0000**	**0.0000**	**84.6259**	**19.3210**	**0.8295**	**0.1894**	**0.0207**	**0.0047**
	Hot Metal Desulf Baghouse	0.3199	0.0730	0.4297	0.0981	0.4407	0.1006	0.0000	0.0000	0.0212	0.0048	0.0088	0.0020
	Continuous Casting	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	CAS Bell Baghouse	0.1071	0.0244	0.1071	0.0244	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	Flux Handling Baghouse	0.0368	0.0084	0.0371	0.0085	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	No. 1 BOP Total	**0.9286**	**0.2120**	**1.2780**	**0.2918**	**0.4407**	**0.1006**	**84.6259**	**19.3210**	**0.8507**	**0.1942**	**0.0296**	**0.0067**
No. 1 BOP Caster	Fugitives (Roof Monitor)	0.0128	0.0029	0.0435	0.0099	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
No. 2 Q-BOP	Gas Cleaning Systems	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	Hot Metal Desulf Baghouse	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	Continuous Casting	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	Secondary Emissions Baghouse	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	116' Elevation North and South Flux Handling System Baghouses	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	North Roof Baghouse (166')	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	South Roof Baghouse (166')	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	Middle Roof Baghouse (166')	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	Day Tank Lime Silo Baghouse	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	Lime Dump Station Baghouse	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	No. 1 Hot Fume Exhaust Baghouse	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	No. 2 Hot Fume Exhaust Baghouse	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	No. 1&2 Material Handling System	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	No. 3 LMF Hot Fume Extraction Exhaust/ Material Handling System	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	No. 3 LMF Material Handling System	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	RH Vacuum Degasser Slag Conditioning Baghouse	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	No. 2 Q-BOP Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**
No. 2 Q-BOP Caster	Fugitives (Roof Monitor)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
OVERALL TOTAL		2.144	0.489	3.514	0.802	7.172	1.638	96.791	22.098	2.415	0.551	0.0542	0.012

Table 3-9

US STEEL GARY WORKS
CONSTRUCTION PERMIT APPLICATION
BLAST FURNACE NO.13 RELINE
CHANGE IN EMISSION RATES FROM COMBUSTION SOURCES

PM_{10}

All Additional Hot Metal Through No. 1 BOP

Emission Unit	Emission Location	Throughput Change	Units	Emission Factor	Units	Capture Efficiency	Control Efficiency	Annual Change in Emissions (tons/yr)	Annual Change in Emissions (lbs/hr)	Source of Emission Factor
Blast Furnace No. 13	Stoves (NG)	7	mmcf	7.60	lb/mmcf	100.00%	0.00%	0.028	0.0064	AP-42
	Stoves (BFG)	233	mmcf	0.96	lb/mmcf	100.00%	0.00%	0.112	0.0255	Oct. 11, 2001 - Stack Test on No. 6 Boiler (100% BFG)
						Total Stoves		0.140	0.0319	
TBBH Boilers	TBBH Boilers (BFG)	649	mmcf	0.96	lb/mmcf	100.00%	0.00%	0.311	0.0711	Oct. 11, 2001 - Stack Test on No. 6 Boiler (100% BFG)
						Total Boiler House		0.311	0.071	

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US Steel Gary Works
Blast Furnace No. 13 Reline
Summary of Calculations Used to Estimate Change in Annual Production/Throughput Rate

Calculation of Change in Hot Metal Production Rate		**Comments**
Change in total steel production rate at No. 1 BOP (tons steel/yr)	20,738	Change in HM / 85% HM/Steel
Change in total steel production rate at No. 2 Q-BOP(tons steel/yr)	0	Change in HM / 85% HM/Steel
Ratio of hot metal to steel	0.85	
Change in hot metal annual production/throughput change (tons HM/yr)	17,627	Throughput Limit for Emissions Less than Significance Level
Baseline Hot Metal Production		**Comments**
No. 13 BF Baseline HM Production in June 1996 through May 1998 (tons HM/yr)	3,040,408	Production Nos from US Steel
Future Hot Metal Production		
No. 13 Future HM Production (tons HM/day)	8,378	
No. 13 Future HM Production (tons HM/yr)	3,058,035	Sum of baseline and change in hot metal production
Calculation of Change in Slag Granulation and Slag Pit Production Rate		**Comments**
Ratio of slag generation per ton of hot metal produced	0.25	Average slag generation rate / average hot metal production (EWB)
Total slag generation rate (tons slag/yr)	4,407	change in tons hot metal x ratio of tons slag per ton hot metal/ 0.25 x Increase in HM
Calculation of Change In Sinter Consumption at BF 13		**Comments**
June 1996 to May 1998 Average Annual Sinter Throughput (tons sinter/yr)	1,108,388.00	Sinter & Pellet Tonnage from Mike M
No. 13 BF Baseline HM Production in June 1996 through May 1998 (tons HM/yr)	3,040,408	Production Nos from US Steel
Sinter to HM Ratio	0.36	
Change in Sinter Plant Throughput (tons sinter/yr)	6,425.96	Sinter to HM Ratio x Change in HM Production
Calculation of PCI Change in Throughput Rate		**Comments**
Pounds of PCI consumed per ton of hot metal (before)	300	Production Rate from US Steel
Pounds of PCI consumed per ton of hot metal (after)	300	Production Rate from US Steel
Average tons of hot metal thruput (before)	3,040,408	Production Nos from US Steel
Average tons of hot metal thruput (after)	3,058,035	3,040,408 + change in hot metal production rate)
Tons of PCI consumed per year (before)	456,061	300 / 2000 x 3,040,408
Tons of PCI consumed per year (after)	458,705	300 / 2000 x (3,040,408 + change in hot metal production rate)
Change in PCI consumed per year (tons coal/yr)	2,644	Tons of PCI consumed (before) - Tons of PCI consumed (after)

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US Steel Gary Works
Blast Furnace No. 13 Reline
Summary of Calculations Used to Estimate Change in Annual Production/Throughput Rate

Calculation of Pigging Throughput Rate		**Comments**
Future Hot Metal Throughput Rate at Pigging Machine (tons hot metal/yr)	0.0	Hot Metal going to No. 1 or 2 Q-BOP Instead
Calculation of Change in Total Steel Production Rate		**Comments**
Change in total steel production rate at No. 1 Q-BOP (tons steel/yr)	20,738	Total Change in Steel Production
Change in total steel production rate at No. 2 Q- BOP (tons steel/yr)	0	Total Change in Steel Production
Calculation of Fuel Consumption Rates at No. 13 BF Stoves		**Comments**
Annual Average Hot Metal Production at BF #13 (tons hot metal/yr)	3,040,408	Production Nos from US Steel
Blast furnace gas heating value (BTU/scf)	90	
Natural gas heating value (BTU/scf)	1,020	
BFG Generation Rate (mmscf/ton hot metal)	0.05	Danieli
Jun 96-May 98No. 13 Blast Furnace BFG Consumption (mmscf/yr)	40,133.00	Production Nos from US Steel
BFG Stove Consumption/ Hot Metal Production	0.0132	
Future BFG Generation (mmscf/yr)	152,902	10,000 NTHM/day x 0.05 mmscf/ton HM x 365 days
1997 NG Consumption (mmscf/yr)	1,269.00	Production Nos from US Steel
NG Heat Input (MMBTU/yr)	1,294,380	NG 1997 Consumption / NG Heating Value
NG stoves consumption rate in mmcf per ton of hot metal	0.000417	Average NG stoves consumption rate / average tons hot metal
Change in BFG Stove Consumption (mmscf/yr)	232.7	Change in tons of hot metal x BFG consumption rate in mmscf per ton hot metal
Calculation of Increase in Fuel Consumption at TBBH Boilers (BFG)		
Excess BFG Gas to TBBH (mmscf/yr)	648.7	0.05 x Change in HM - Change in Stove Consump.
Change in NG Consumption Rate (mmscf/yr)	7.4	Change in tons of hot metal x NG consumption rate in mmscf per ton hot metal
Calculation of Change in Steel Processed at Round Casting		
Change in Steel Processed from Round Casting (tons steel/yr)	0	(4,000 THM/day x 365 days/yr) / 85%

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US Steel Gary Works
Blast Furnace No. 13 Reline
Summary of Calculations Used to Estimate Change in Annual Production/Throughput Rate

NO. 1 BOP		
1997 Steel Production at No. 1 BOP (tons steel/yr)	3,652,703.0	STEPS Spreadsheet
Calculation of change in Steel Production at No. 1 BOP		
Change in Steel Prodcution (tons steel/yr)	20,738	Total change in steel production
Change in Hot Metal Production (tons hot metal/yr)	17,627	Total change in hot metal production
Calculation of Change in Steel Processed at Continuous Casting		
Change in Steel Processed from Continuous Casting (tons steel/yr)	20,738	Total change in Steel Production
Calculation of Change in Steel Processed at CAS Bell/ OB Lancing		
Change in Steel Processed at CAS Bell/ OB Lancing (tons steel/yr)	20,738	Total change in steel production
NO. 2 Q-BOP		
1997 Annual Average Steel Production at No. 2 Q-BOP (tons steel/yr)	4,017,774	STEPS Spreadsheet
Calculation of change in Steel Production at No. 2 Q-BOP		
Change in Steel Production (tons steel/yr)	0	Total change in steel production
Change in Hot Metal Production (tons hot metal/yr)	0	Total change in hot metal production
Calculation of Change in Steel Processed at Continuous Casting		
Change in Steel Processed at No. 2Q- BOP Caster (tons steel/yr)	0	Total change in steel production
Calculation of Change in Steel Processed at LMF 1&2 Electric Arc		
Change in Steel Processed at LMF 1 &2 Electric Arc (tons steel/yr)	0	33% of change in steel produced
Calculation of Change in Steel Processed at LMF 1&2 Material Handling		
Change in Steel Processed at LMF 1&2 Material Handling (tons steel/yr)	0	66% of change in steel produced
Calculation of Change in Steel Processed at LMF 3 Electric Arc		
Change in Steel Processed at LMF 3 Electric Arc (tons steel/yr)	0	33% of change in steel produced
Calculation of Change in Steel Processed at LMF 3 Material Handling Sys		
Change in Steel Processed Consumption Rate (tons steel/yr)	0	33% of change in steel produced
Calculation of Change in Steel Throughput at RH Vacuum Degasser		
June 1996 - May 1998 Steel Throughput at RH Vacuum Degasser (tons steel/yr)	1,424,484.0	STEPS Spreadsheet
Ratio of Steel Throughput at PH Vacuum Degasser / Average Annual Steel Production (entire plant)	0.185710	Annual Average Steel Processed at Ladle Dryers / Annual Average Steel Production
Change in Steel Throuhput Rate at RH Vacuum Degasser(tons steel/yr)	0	Increase in Steel Production x Ratio
Calculation of Change in Fuel Consumption at Sinter Plant		**Comments**
Change in Sinter Plant Production Rate (tons sinter/hr)	0	Production Rate from EWB
Future NG Consumption Rate (MMSCF/yr)	0	Change in Sinter Production / Change in Sinter Prod Rate x 25 MMBTU/hr / (NG Heating Value x 2 lines)

DRAFT

US Steel Gary Works
Blast Furnace No. 13 Reline
Calculation of Annual Change in Production/Throughput Rate

Emission Unit	Emission Location	Annual Production/ Thruput Change	Units	Comments
Blast Furnace No. 13	Casthouse Fugitives	17,627	hot metal	Total change in Hot Metal production
	Slag Pit Operation	4,407	slag	25% of total change in hot metal production
	Charging	17,627	hot metal	Total change in Hot Metal production
	Sinter Screening	0	sinter	No longer in use
PCI	Coal Pulverizing Building	2,644	coal	4,000 NTHM per day
No. 1 BOP	O2 Blowing, Charging & Tapping	20,738	steel	Total change in Steel production
	Hot Metal Desulf	17,627	hot metal	Total change in Hot Metal production
	Continuous Casting	20,738	steel	Total change in Steel production
	CAS Bell	20,738	steel	Total change in Steel production
	Flux Handling	20,738	steel	Total change in Steel production
	Fugitives	20,738	steel	Not Applicable
No. 1 BOP Caster	Fugitives	20,738	steel	Total change in Steel production

DRAFT

US Steel Gary Works
Blast Furnace No. 13 Reline
Calculation of Annual Change in Production/Throughput Rate

Emission Unit	Emission Location	Annual Production/ Thruput Change	Units	Comments
No. 2 Q-BOP	O2 Blowing, Charging & Tapping	0	steel	Total change in Steel production
	Hot Metal Desulf	0	hot metal	Total change in Hot Metal production
	Continuous Casting	0	steel	Total change in Steel production
	Secondary Emission Control Baghouse	0	steel	Total change in Steel production
	North Roof Baghouse	0	steel	Total change in Steel production
	Middle Roof Baghouse	0	steel	Total change in Steel production
	South Roof Baghouse	0	steel	Total change in Steel production
	166' Elevation North & South Flux Handling System Baghouse Baghouses	0	steel	Total change in Steel production
	Day Tank Lime Silo Baghouse	0	steel	Total change in Steel production
	Lime Dump Station Baghouse	0	steel	Total change in Steel production
	Fugitives	0	steel	Not Applicable
No. 2 Q-BOP Caster	Fugitives	0	steel	Total change in Steel production
No. 2 Q-BOP LMF	LMF 1 Electric Arc	0	steel	1/3 of total change in steel production
	LMF 2 Electric Arc	0	steel	1/3 of total change in steel production
	LMF 1 & 2 Material Handling Sys	0	steel	1/2 of total change in steel production
	LMF 3 Hot Fume Extraction Exhaust	0	steel	1/3 of total change in steel production
	RH Vacuum Degasser	0	steel	19% of total change in steel production
	LMF 3 Material Handling System	0	steel	1/3 of total change in steel production
Blast Furnace No. 13	Stoves (NG)	7	mmcf	0.04% of total change in hot metal production
	Stoves (BFG)	233	mmcf	1.3% of total change in hot metal production
TBBH	TBBH Boiler No. 1 (BFG)	649	mmcf	Total change in hot metal prod x BFG gen. rate - BFG consumption at the stoves

U.S. Steel Gary Works
Calculation of Change in Hours of Operation
Baghouses with PM10 Limits (lbs/hr)

All Additional Hot Metal Through No Emission Location	Future Hours of Operation	Current	Increase Operation Hours
No.13 BF Casthouse Baghouse	8,154	8,147	8
Nos.1 & 2 BOPs Baghouse	7,572	7,534	38
No. 2 Q-BOP	8,275	8,234	41

Table 3-2
US STEEL GARY WORKS
CONSTRUCTION PERMIT APPLICATION
BLAST FURNACE NO.13 RELINE
CHANGE IN EMISSION RATES FROM PROCESS SOURCES

PM

All Additional Hot Metal Through No. 1 BOP

Emission Unit	Emission Location	Annual Production/ Throughput Change	Units (tons)	Emission Factor	Units	Capture Efficiency	Control Efficiency	Annual Change in Emissions (tons/yr)	Annual Change in Emissions (lbs/hr)	Source of Emission Factor
No. 13 Blast Furnace	Casthouse Fugitives *	17,627	hot metal	0.60	lb/ton	99.80%	N/A	0.0032	0.0007	AP-42
	Casthouse Emission Control Baghouse	8	hours	0.0024	lb/ton	N/A	N/A	0.0000	0.0000	SIP Limit (Controlled Emissions)
	Slag Pit Operations	4,407	slag	0.396	lb/ton	0.00%	0.00%	0.8728	0.1993	ISPAT Inland Permit Application
PCI	Coal Pulverizer Bldg.	2,644	coal	0.008	lb/ton	N/A	N/A	0.0106	0.0024	Ispat Inland PCI Controlled Emission Factor
No. 1 BOP Shop	Fugitives (Roof Monitor)					N/A	N/A	0.4766	0.1088	See PM Fugitive Emission Calculation Table
	Gas Cleaning System (2 units)	20,738	molten steel	36.97	lb/ton	99.72%	99.90%	0.3823	0.0873	AP-42
	Hot Metal Desulfurization Baghouse	38	hours	15.00	lb/hr	N/A	N/A	0.2856	0.0652	SIP Limit (Controlled Emissions)
	Continuous Casting	20,738	molten steel	0.014	lb/ton	0.00%	0.00%	0.0000	0.0000	PM10 SIP Background Documentation for No. 2 Caster
	CAS Bell/OB Lancing Baghouse	38	hours	5.100	lb/hr	N/A	N/A	0.0971	0.0222	SIP Limit (Controlled Emissions)
	Flux Handling Baghouse	38	hours	1.920	lb/hr	N/A	N/A	0.0366	0.0083	SIP Modeling Limit
No. 1 BOP Caster	Fugitives (Roof Monitor) *	20,738	molten steel	0.014	lb/ton	0.00%	N/A	0.0435	0.0099	PM10 SIP Background Documentation for No. 2 Caster

Table 3-2
US STEEL GARY WORKS
CONSTRUCTION PERMIT APPLICATION
BLAST FURNACE NO.13 RELINE
CHANGE IN EMISSION RATES FROM PROCESS SOURCES
PM

All Additional Hot Metal Through No. 1 BOP

Emission Unit	Emission Location	Annual Production/ Throughput Change	Units (tons)	Emission Factor	Units	Capture Efficiency	Control Efficiency	Annual Change in Emissions		Source of Emission Factor
								(tons/yr)	(lbs/hr)	
No. 2 Q-BOP Shop LMF	Fugitives (Roof Monitor)					N/A	N/A	0.0000	0.0000	See PM Fugitive Emission Calculation Table
	Gas Cleaning System (2 units)	0	molten steel	36.960	lb/ton	99.72%	99.90%	0.0000	0.0000	AP-42
	Hot Metal Desulfurization Baghouse	0	hours	13.000	lb/hr	N/A	N/A	0.0000	0.0000	SIP Limit (Controlled Emissions)
	Continuous Casting *	0	molten steel	0.014	lb/ton	95.00%	99.99%	0.0000	0.0000	PM10 SIP Background Documentation for No. 2 Caster
	Secondary Emissions Baghouse	0	hours	27.000	lb/hr	N/A	N/A	0.0000	0.0000	SIP Limit (Controlled Emissions)
	116' Elevation North and South Flux Handling System Baghouses	0	hours	1.800	lb/hr	N/A	N/A	0.0000	0.0000	SIP Limit (Controlled Emissions)
	North Roof Baghouse (166')	0	hours	0.510	lb/hr	N/A	N/A	0.0000	0.0000	SIP Limit (Controlled Emissions)
	South Roof Baghouse (166')	0	hours	0.510	lb/hr	N/A	N/A	0.0000	0.0000	SIP Limit (Controlled Emissions)
	Middle Roof Baghouse (166')	0	hours	0.510	lb/hr	N/A	N/A	0.0000	0.0000	SIP Limit (Controlled Emissions)
	Day Tank Lime Silo Baghouse	0	hours	0.810	lb/hr	N/A	N/A	0.0000	0.0000	SIP Modeling Limit
	Lime Dump Station Baghouse	0	hours	0.450	lb/hr	N/A	N/A	0.0000	0.0000	SIP Modeling Limit
	No. 1 Hot Fume Exhaust Baghouse	0	hours	5.100	lb/hr	N/A	N/A	0.0000	0.0000	SIP Limit (Controlled Emissions)
	No. 2 Hot Fume Exhaust Baghouse	0	hours	5.1	lb/hr	N/A	N/A	0.0000	0.0000	SIP Limit (Controlled Emissions)
	LMF 1 & 2 Material Handling System	0	hours	3.830	lb/hr	N/A	N/A	0.0000	0.0000	SIP Limit (Controlled Emissions)
	No. 3 LMF Hot Fume Extracation Exhaust	0	hours	2.700	lb/hr	N/A	N/A	0.0000	0.0000	SIP Limit (Controlled Emissions)
	RH Vacuum Degasser Slag Conditioning Baghouse	0	hours	5.490	lb/hr	N/A	N/A	0.0000	0.0000	SIP Limit (Controlled Emissions)
No. 2 Q-BOP Caster	Fugitives (Roof Monitor) *	0	molten steel	0.014	lb/ton	95.00%	N/A	0.0000	0.0000	PM10 SIP Background Documentation for No. 2 Caster

* - Emission unit locations where 70% containment efficiency was applied to the controlled annual change in emissions

Table 3-2a
US STEEL GARY WORKS
CONSTRUCTION PERMIT APPLICATION
BLAST FURNACE NO.13 RELINE
FUGITIVE EMISSION CALCULATION
PM
All Additional Hot Metal Through No. 1 BOP

Emission Unit	Emission Location	Annual Production/ Throughput Change	Units (tons)	Emission Factor	Units	Capture Efficiency	Annual Change in Emissions		Source of Emission Factor
							(tons/yr)	(lbs/hr)	
No. 1 BOP Shop	Gas Cleaning System (2 units)	20,738	molten steel	36.96	lb/ton	99.72%	0.3219	0.0735	AP-42
	Hot Metal Desulfurization Baghouse *	17,627	hot metal	1.09	lb/ton	98.50%	0.1441	0.0329	AP-42
	CAS Bell Baghouse	20,738	molten steel	0.0640	lb/ton	94.99%	0.0100	0.0023	Source Registration Notification (April 1995)
	Flux Handling Baghouse	20,738	molten steel	0.0190	lb/ton	99.00%	0.0006	0.0001	AP-42
Total Fugitives (Roof Monitor - 70% Building Containment Efficiency where applicable)							0.477	0.109	
No. 2 Q-BOP Shop & LMF	Gas Cleaning System (2 units)	0	molten steel	36.7900	lb/ton	99.72%	0.0000	0.0000	AP-42
	Hot Metal Desulfurization Baghouse	0	hot metal	1.2590	lb/ton	99.40%	0.0000	0.0000	AP-42
	No. 1 Hot Fume Exhaust Baghouse	0	molten steel	0.17	lb/ton	94.99%	0.0000	0.0000	Gary Works No. 3 LMF CPA Addendum (April 1995)
	No. 2 Hot Fume Exhaust Baghouse	0	molten steel	0.17	lb/ton	94.99%	0.0000	0.0000	Gary Works No. 3 LMF CPA Addendum (April 1995)
	LMF 1 & 2 Material Handling System	0	molten steel	0.019	lb/ton	95.00%	0.0000	0.0000	AP-42
	No. 3 LMF Hot Fume Extracation Exhaust/ Material Handling	0	molten steel	0.17	lb/ton	97.99%	0.0000	0.0000	Gary Works No. 3 LMF CPA Addendum (April 1995)
	RH Vacuum Degasser Slag Conditioning Baghouse	0	molten steel	0.165	lb/ton	100.00%	0.0000	0.0000	Nippon Steel Test
	116' Elevation North and South Flux Handling Baghouse	0	molten steel	0.019	lb/ton	99.00%	0.0000	0.0000	Same as LMF Material Handling
	North Roof Baghouse (166')	0	molten steel	0.019	lb/ton	99.00%	0.0000	0.0000	Same as LMF Material Handling
	South Roof Baghouse (166')	0	molten steel	0.019	lb/ton	99.00%	0.0000	0.0000	Same as LMF Material Handling
	Middle Roof Baghouse (166')	0	molten steel	0.019	lb/ton	99.00%	0.0000	0.0000	Same as LMF Material Handling
	Day Tank Lime Silo Baghouse *	0	molten steel	0.019	lb/ton	99.00%	0.0000	0.0000	Same as LMF Material Handling
	Lime Dump Station Baghouse *	0	molten steel	0.019	lb/ton	99.00%	0.0000	0.0000	Same as LMF Material Handling
Total Fugitives (Roof Monitor - 70% Building Containment Efficiency where applicable)							0.0000	0.0000	

* - Emissions Unit Locations where 70% containment efficiency was not applicable.

Table 3-8
US STEEL GARY WORKS
CONSTRUCTION PERMIT APPLICATION
BLAST FURNACE NO.13 RELINE
CHANGE IN EMISSION RATES FROM COMBUSTION SOURCES

PM

All Additional Hot Metal Through No. 1 BOP

Emission Unit	Emission Location	Throughput Change	Units	Emission Factor	Units	Capture Efficiency	Control Efficiency	Annual Change in Emissions (tons/yr)	Annual Change in Emissions (lbs/hr)	Source of Emission Factor
Blast Furnace No. 13	Stoves (NG)	7	mmcf	7.60	lb/mmcf	100.00%	0.00%	0.028	0.0064	AP-42
	Stoves (BFG)	233	mmcf	2.90	lb/mmcf	100.00%	0.00%	0.337	0.0770	AIRS
	Total Stoves							0.365	0.083	
TBBH Boilers	TBBH Boilers (BFG)	649	mmcf	2.90	lb/mmcf	100.00%	0.00%	0.941	0.2147	AIRS
	Total Boiler House							0.941	0.215	

Table 3-3

US STEEL GARY WORKS
CONSTRUCTION PERMIT APPLICATION
BLAST FURNACE NO.13 RELINE
CHANGE IN EMISSION RATES FROM PROCESS SOURCES
PM_{10}

All Additional Hot Metal Through No. 1 BOP

Emission Unit	Emission Location	Annual Production/ Throughput Change	Units (tons)	Emission Factor	Units	Capture Efficiency	Control Efficiency	Annual Change in Emissions		Source of Emission Factor
								(tons/yr)	(lbs/hr)	
No. 13 Blast Furnace	Casthouse Fugitives *	17,627	hot metal	0.306	lb/ton	99.80%	N/A	0.0016	0.0004	AP-42
	Casthouse Emission Control Baghouse	8	hours	38.570	lbs/hr	N/A	N/A	0.1463	0.0334	SIP Limit (Controlled Emissions)
	Slag Pit Operations	4,407	slag	0.2697	lb/ton	0.00%	0.00%	0.5942	0.1357	ISPAT Inland Permit
PCI	Coal Pulverizer Bldg.	2,644	coal	0.007	lb/ton	N/A	N/A	0.0093	0.0021	Ispat Inland PCI Controlled Emission Factor
No. 1 BOP Shop	Fugitives (Roof Monitor)					N/A	N/A	0.2571	0.0587	See PM10 Fugitive Emission Calculation Table
	Gas Cleaning System (2 units)	20,738	molten steel	24.40	lb/ton	99.72%	99.90%	0.2523	0.0576	AP-42
	Hot Metal Desulfurization Baghouse	38	hours	15.00	lbs/hr	N/A	N/A	0.2856	0.0652	SIP Limit (Controlled Emissions)
	Continuous Casting	20,738	molten steel	0.0041	lb/ton	0.00%	0.00%	0.0000	0.0000	PM10 SIP Background Documentation for No. 2 Caster
	CAS Bell/OB Lancing Baghouse	38	hours	5.1000	lbs/hr	N/A	N/A	0.0971	0.0222	SIP Limit (Controlled Emissions)
	Flux Handling Baghouse	38	hours	1.9200	lbs/hr	N/A	N/A	0.0366	0.0083	SIP Modeling Limit
No. 1 BOP Caster	Fugitives (Roof Monitor) *	20,738	molten steel	0.0041	lb/ton	0.00%	N/A	0.0128	0.0029	PM10 SIP Background Documentation for No. 2 Caster

US STEEL GARY WORKS
CONSTRUCTION PERMIT APPLICATION
BLAST FURNACE NO.13 RELINE
CHANGE IN EMISSION RATES FROM PROCESS SOURCES
PM_{10}

All Additional Hot Metal Through No. 1 BOP

Emission Unit	Emission Location	Annual Production/ Throughput Change	Units (tons)	Emission Factor	Units	Capture Efficiency	Control Efficiency	Annual Change in Emissions		Source of Emission Factor
								(tons/yr)	(lbs/hr)	
No. 2 Q-BOP Shop LMF	Fugitives (Roof Monitor)					N/A	N/A	0.0000	0.0000	See PM10 Fugitive Emission Calculation Table
	Gas Cleaning System (2 units)	0	molten steel	24.1000	lb/ton	99.72%	99.55%	0.0000	0.0000	AP-42
	Hot Metal Desulfurization Baghouse	0	hours	13.0000	lbs/hr	N/A	N/A	0.0000	0.0000	SIP Limit (Controlled Emissions)
	Continuous Casting *	0	molten steel	0.0041	lb/ton	95.00%	99.00%	0.00E+00	0.00E+00	PM10 SIP Background Documentation for No. 2 Caster
	Secondary Emissions Baghouse	0	hours	27.0000	lbs/hr	N/A	N/A	0.0000	0.0000	SIP Limit (Controlled Emissions)
	116' Elevation North and South Flux Handling System Baghouses	0	hours	1.8000	lbs/hr	N/A	N/A	0.0000	0.0000	SIP Limit (Controlled Emissions)
	North Roof Baghouse (166')	0	hours	0.5100	lbs/hr	N/A	N/A	0.0000	0.0000	SIP Limit (Controlled Emissions)
	South Roof Baghouse (166')	0	hours	0.5100	lbs/hr	N/A	N/A	0.0000	0.0000	SIP Limit (Controlled Emissions)
	Middle Roof Baghouse (166')	0	hours	0.5100	lbs/hr	N/A	N/A	0.0000	0.0000	SIP Limit (Controlled Emissions)
	Day Tank Lime Silo Baghouse	0	hours	0.8100	lbs/hr	N/A	N/A	0.0000	0.0000	SIP Modeling Limit
	Lime Dump Station Baghouse	0	hours	0.4500	lbs/hr	N/A	N/A	0.0000	0.0000	SIP Modeling Limit
	No. 1 Hot Fume Exhaust Baghouse	0	hours	5.10	lbs/hr	N/A	N/A	0.0000	0.0000	SIP Limit (Controlled Emissions)
	No. 2 Hot Fume Exhaust Baghouse	0	hours	5.10	lbs/hr	N/A	N/A	0.0000	0.0000	SIP Limit (Controlled Emissions)
	LMF 1 & 2 Material Handling System	0	hours	3.830	lbs/hr	N/A	N/A	0.0000	0.0000	SIP Limit (Controlled Emissions)
	No. 3 LMF Hot Fume Extracation Exhaust/ Material Handling System	0	hours	2.70	lbs/hr	N/A	N/A	0.0000	0.0000	SIP Limit (Controlled Emissions)
	RH Vacuum Degasser Slag Conditioning Baghouse	0	hours	5.49	lbs/hr	N/A	N/A	0.0000	0.0000	SIP Limit (Controlled Emissions)
	LMF 3 Material Handling System	0	hours	0.000	lbs/hr	N/A	N/A	0.0000	0.0000	Not Applicable
No. 2 Q-BOP Caster	Fugitives (Roof Monitor) *	0	molten steel	0.0041	lb/ton	95.00%	N/A	0.0000	0.0000	PM10 SIP Background Documentation for No. 2 Caster

* - Emission unit locations where 70% containment efficiency was applied to the controlled annual change in emissions

Table 3-3a
US STEEL GARY WORKS
CONSTRUCTION PERMIT APPLICATION
BLAST FURNACE NO.13 RELINE
FUGITIVE EMISSION CALCULATION

PM_{10}

All Additional Hot Metal Through No. 1 BOP

Emission Unit	Emission Location	Annual Production/ Throughput Change	Units (tons)	Emission Factor	Units	Capture Efficiency	Annual Change in Emissions (tons/yr)	Annual Change in Emissions (lbs/hr)	Source of Emission Factor
No. 1 BOP Shop	Gas Cleaning System (2 units)	20,738	molten steel	24.40	lb/ton	99.72%	0.2125	0.0485	AP-42
	Hot Metal Desulfurization Baghouse *	17,627	hot metal	0.26	lb/ton	98.50%	0.0344	0.0078	AP-42
	CAS Bell Baghouse	20,738	molten steel	0.0640	lb/ton	94.99%	0.0100	0.0023	Source Registration Notification (April 1995)
	Flux Handling Baghouse	20,738	molten steel	0.0090	lb/ton	99.00%	0.0003	0.0001	AP-42
Total Fugitives (Roof Monitor - 70% Building Containment Efficiency where applicable)							0.257	0.059	
No. 2 Q-BOP Shop & LMF	Gas Cleaning System (2 units)	0	molten steel	24.1000	lb/ton	99.72%	0.0000	0.0000	AP-42
	Hot Metal Desulfurization Baghouse	0	hot metal	0.3340	lb/ton	99.40%	0.0000	0.0000	AP-42
	No. 1 Hot Fume Exhaust Baghouse	0	molten steel	0.17	lb/ton	94.99%	0.0000	0.0000	Gary Works No. 3 LMF CPA Addendum (April 1995)
	No. 2 Hot Fume Exhaust Baghouse	0	molten steel	0.17	lb/ton	94.99%	0.0000	0.0000	Gary Works No. 3 LMF CPA Addendum (April 1995)
	LMF 1 & 2 Material Handling System	0	molten steel	0.009	lb/ton	95.00%	0.0000	0.0000	AP-42
	No. 3 LMF Hot Fume Extracation Exhaust	0	molten steel	0.17	lb/ton	97.99%	0.0000	0.0000	Gary Works No. 3 LMF CPA Addendum (April 1995)
	RH Vacuum Degasser Slag Conditioning Baghouse	0	molten steel	0.165	lb/ton	100.00%	0.0000	0.0000	Nippon Steel Test
	LMF 3 Material Handling System	0	molten steel	0.009	lb/ton	97.99%	0.0000	0.0000	AP-42
	116' Elevation North and South Flux Handling Baghouse	0	molten steel	0.009	lb/ton	99.00%	0.0000	0.0000	Same as LMF Material Handling
	North Roof Baghouse (166')	0	molten steel	0.009	lb/ton	99.00%	0.0000	0.0000	Same as LMF Material Handling
	South Roof Baghouse (166'I	0	molten steel	0.009	lb/ton	99.00%	0.0000	0.0000	Same as LMF Material Handling
	Middle Roof Baghouse (166')	0	molten steel	0.009	lb/ton	99.00%	0.0000	0.0000	Same as LMF Material Handling
	Day Tank Lime Silo Baghouse *	0	molten steel	0.0D9	lb/ton	99.00%	0.0000	0.0000	Same as LMF Material Handling
	Lime Dump Station Baghouse *	0	molten steel	0.009	lb/ton	99.00%	0.0000	0.0000	Same as LMF Material Handling
Total Fugitives (Roof Monitor - 70% Building Containment Efficiency where applicable)							0.0000	0.0000	

* - Emissions Unit Locations where 70% containment efficiency was not applicable.

Table 3-9
US STEEL GARY WORKS
CONSTRUCTION PERMIT APPLICATION
BLAST FURNACE NO.13 RELINE
CHANGE IN EMISSION RATES FROM COMBUSTION SOURCES

PM_{10}

All Additional Hot Metal Through No. 1 BOP

Emission Unit	Emission Location	Throughput Change	Units	Emission Factor	Units	Capture Efficiency	Control Efficiency	Annual Change in Emissions		Source of Emission Factor
								(tons/yr)	(lbs/hr)	
Blast Furnace No. 13	Stoves (NG)	7	mmcf	7.60	lb/mmcf	100.00%	0.00%	0.028	0.0064	AP-42
	Stoves (BFG)	233	mmcf	0.96	lb/mmcf	100.00%	0.00%	0.112	0.0255	Oct. 11, 2001 - Stack Test on No. 6 Boiler (100% BFG)
	Total Stoves							0.140	0.0319	
TBBH Boilers	TBBH Boilers (BFG)	649	mmcf	0.96	lb/mmcf	100.00%	0.00%	0.311	0.0711	Oct. 11, 2001 - Stack Test on No. 6 Boiler (100% BFG)
	Total Boiler House							0.311	0.071	

Table 3-4
US STEEL GARY WORKS
CONSTRUCTION PERMIT APPLICATION
BLAST FURNACE NO.13 RELINE
CHANGE IN EMISSION RATES FROM PROCESS SOURCES
SO_2

All Additional Hot Metal Through No. 1 BOP

Emission Unit	Emission Location	Annual Production/ Throughput Change	Units (tons)	Emission Factor	Units	Capture Efficiency	Control Efficiency	Annual Change in Emissions		Source of Emission Factor
								(tons/yr)	(lbs/hr)	
No. 13 Blast Furnace	Casthouse Fugitives	17,627	hot metal	0.329	lb/ton	99.80%	N/A	0.0058	0.0013	June 11, 2002 letter and SO2 SIP
	Casthouse Emission Control Baghouse	17,627	hot metal	0.329	lb/ton	99.80%	0.00%	2.8976	0.6616	SIP Limit and Future Production Rate
	Slag Pit Operations	4,407	slag	0.4585	lb/ton	0.00%	0.00	1.0102	0.2307	EWB Engineering Calculation
PCI	Coal Pulverizer Bldg.	2,644	coal	0.00	lb/ton	N/A	N/A	0.0000	0.0000	Not Applicable
No. 1 BOP Shop	Fugitives (Roof Monitor)					N/A	N/A	0.0066	0.0015	See SO2 Fugitive Emission Calculation Table
	Gas Cleaning System (2 units)	20,738	molten steel	0.00	lb/ton	0.00%	0.00%	0.0000	0.0000	Not Applicable
	Hot Metal Desulfurization Baghouse	17,627	hot metal	0.05	lb/ton	98.50%	0.00%	0.4341	0.0991	June 11, 2002 letter and SO2 SIP
	Continuous Casting	20,738	molten steel	0.00	lb/ton	0.00%	0.00%	0.0000	0.0000	Not Applicable
	CAS Bell/OB Lancing Baghouse	20,738	molten steel	0.0000	lb/ton	94.99%	0.00%	0.0000	0.0000	Not Applicable
	Flux Handling Baghouse	20,738	molten steel	0.0000	lb/ton	99.00%	0.00%	0.0000	0.0000	Not Applicable
No. 1 BOP Caster	Fugitives (Roof Monitor)	20,738	molten steel	0.0000	lb/ton	0.00%	N/A	0.0000	0.0000	Not Applicable

US STEEL GARY WORKS
CONSTRUCTION PERMIT APPLICATION
BLAST FURNACE NO.13 RELINE
CHANGE IN EMISSION RATES FROM PROCESS SOURCES

SO_2

All Additional Hot Metal Through No. 1 BOP

Emission Unit	Emission Location	Annual Production/ Throughput Change	Units (tons)	Emission Factor	Units	Capture Efficiency	Control Efficiency	Annual Change in Emissions		Source of Emission Factor
								(tons/yr)	(lbs/hr)	
No. 2 Q-BOP Shop LMF	Fugitives (Roof Monitor)					N/A	N/A	0.0000	0.0000	See SO2 Fugitive Emission Calculation Table
	Gas Cleaning System (2 units)	0	molten steel	0.0000	lb/ton	0.00%	0.00%	0.0000	0.0000	Not Applicable
	Hot Metal Desulfurization Baghouse	0	hot metal	0.0500	lb/ton	99.40%	0.00%	0.0000	0.0000	June 11, 2002 letter and SO2 SIP
	Continuous Casting	0	molten steel	0.0000	lb/ton	95.00%	0.00%	0.0000	0.0000	Not Applicable
	Secondary Emissions Baghouse	0	molten steel	0.0000	lb/ton	0.00%	0.00%	0.0000	0.0000	Not Applicable
	116' Elevation North and South Flux Handling System Baghouses	0	molten steel	0.0000	lb/ton	99.00%	0.00%	0.0000	0.0000	Not Applicable
	North Roof Baghouse (166')	0	molten steel	0.0000	lb/ton	99.00%	0.00%	0.0000	0.0000	Not Applicable
	South Roof Baghouse (166')	0	molten steel	0.0000	lb/ton	99.00%	0.00%	0.0000	0.0000	Not Applicable
	Middle Roof Baghouse (166')	0	molten steel	0.0000	lb/ton	99.00%	0.00%	0.0000	0.0000	Not Applicable
	Day Tank Lime Silo Baghouse	0	molten steel	0.0000	lb/ton	99.00%	0.00%	0.0000	0.0000	Not Applicable
	Lime Dump Station Baghouse	0	molten steel	0.0000	lb/ton	99.00%	0.00%	0.0000	0.0000	Not Applicable
	No. 1 Hot Fume Exhaust Baghouse	0	molten steel	0.00	lb/ton	94.99%	0.00%	0.0000	0.0000	Not Applicable
	No. 2 Hot Fume Exhaust Baghouse	0	molten steel	0.00	lb/ton	94.99%	0.00%	0.0000	0.0000	Not Applicable
	LMF 1 & 2 Material Handling System	0	molten steel	0.00	lb/ton	95.00%	0.00%	0.0000	0.0000	Not Applicable
	No. 3 LMF Hot Fume Extracation Exhaust	0	molten steel	0.00	lb/ton	97.99%	0.00%	0.0000	0.0000	Not Applicable
	RH Vacuum Degasser Slag Conditioning Baghouse	0	molten steel	0.00	lb/ton	100.00%	0.00%	0.0000	0.0000	Not Applicable
	No. 3 LMF Material Handling System	0	molten steel	0.00	lb/ton	97.99%	0.00%	0.0000	0.0000	Not Applicable
No. 2 Q-BOP Caster	Fugitives (Roof Monitor)	0	molten steel	0.0000	lb/ton	95.00%	N/A	0.0000	0.0000	Not Applicable

Table 3-4a

US STEEL GARY WORKS
CONSTRUCTION PERMIT APPLICATION
BLAST FURNACE NO.13 RELINE
FUGITIVE EMISSION CALCULATION

SO_2

All Additional Hot Metal Through No. 1 BOP

Emission Unit	Emission Location	Annual Production/ Throughput Change	Units (tons)	Emission Factor	Units	Capture Efficiency	Annual Change in Emissions		Source of Emission Factor
							(tons/yr)	(lbs/hr)	
No. 1 BOP Shop	Gas Cleaning System (2 units)	20,738	molten steel	0.00	lb/ton	99.72%	0.0000	0.0000	Not Applicable
	Hot Metal Desulfurization Baghouse	17,627	hot metal	0.05	lb/ton	98.50%	0.0066	0.0015	Hot Metal Desulf Factor
	CAS Bell Baghouse	20,738	molten steel	0.0000	lb/ton	94.99%	0.0000	0.0000	Not Applicable
	Flux Handling Baghouse	20,738	molten steel	0.0000	lb/ton	99.00%	0.0000	0.0000	Not Applicable
						Total Fugitives	0.007	0.002	
No. 2 Q-BOP Shop & LMF	Gas Cleaning System (2 units)	0	molten steel	0.0000	lb/ton	99.72%	0.0000	0.0000	Not Applicable
	Hot Metal Desulfurization Baghouse	0	hot metal	0.0500	lb/ton	99.40%	0.0000	0.0000	Hot Metal Desulf Factor
	No. 1 Hot Fume Exhaust Baghouse	0	molten steel	0.00	lb/ton	94.99%	0.0000	0.0000	Not Applicable
	No. 2 Hot Fume Exhaust Baghouse	0	molten steel	0.00	lb/ton	94.99%	0.0000	0.0000	Not Applicable
	LMF 1 & 2 Material Handling System	0	molten steel	0.00	lb/ton	95.00%	0.0000	0.0000	Not Applicable
	No. 3 LMF Hot Fume Extracation Exhaust	0	molten steel	0.00	lb/ton	97.99%	0.0000	0.0000	Not Applicable
	RH Vacuum Degasser Slag Conditioning Baghouse	0	molten steel	0.00	lb/ton	100.00%	0.0000	0.0000	Not Applicable
	LMF 3 Material Handling System	0	molten steel	0.00	lb/ton	97.99%	0.0000	0.0000	Not Applicable
						Total Fugitives	0.0000	0.0000	Not Applicable
						Total Fugitives (Roof Monitor - 70% Building Containment Efficiency	0.0000	0.0000	

Table 3-10
US STEEL GARY WORKS
CONSTRUCTION PERMIT APPLICATION
BLAST FURNACE NO.13 RELINE
CHANGE IN EMISSION RATES FROM COMBUSTION SOURCES

SO_2

All Additional Hot Metal Through No. 1 BOP

Emission Unit	Emission Location	Throughput Change	Units	Emission Factor	Units	Capture Efficiency	Control Efficiency	Annual Change in Emissions		Source of Emission Factor
								(tons/yr)	(lbs/hr)	
Blast Furnace No. 13	Stoves (NG)	7	mmcf	0.60	lb/mmcf	100.00%	0.00%	0.002	0.0005	AP-42 (1998)
	Stoves (BFG)	233	mmcf	6.39	lb/mmcf	100.00%	0.00%	0.743	0.1697	IDEM SO2 Quarterly Report
	Total Stoves							0.746	0.170	
TBBH Boilers	TBBH Boilers (BFG)	649	mmcf	6.39	lb/mmcf	100.00%	0.00%	2.073	0.4732	IDEM SO2 Quarterly Report
	Total Boiler House							2.073	0.473	

Table 3-5
US STEEL GARY WORKS
CONSTRUCTION PERMIT APPLICATION
BLAST FURNACE NO.13 RELINE
CHANGE IN EMISSION RATES FROM PROCESS SOURCES
NO_x

All Additional Hot Metal Through No. 1 BOP

Emission Unit	Emission Location	Annual Production/ Throughput Change	Units (tons)	Emission Factor	Units	Capture Efficiency	Control Efficiency	Annual Change in Emissions		Source of Emission Factor
								(tons/yr)	(lbs/hr)	
No. 13 Blast Furnace	Casthouse Fugitives	17,627	hot metal	0.0248	lb/ton	99.80%	N/A	0.0004	0.0001	ISPAT Inland Stack Test
	Casthouse Emission Control Baghouse	17,627	hot metal	0.0248	lb/ton	99.80%	0.00%	0.2181	0.0498	ISPAT Inland Stack Test
	Slag Pit Operations	4,407	slag	0.0211	lb/ton	0.00%	0.00%	0.0465	0.0106	ISPAT Inland Permit Application
PCI	Coal Pulverizer Bldg.	2,644	coal	0.000	lb/ton	N/A	N/A	0.0000	0.0000	Not Applicable
No. 1 BOP Shop	Fugitives (Roof Monitor)					N/A	N/A	0.0026	0.0006	See NOx Fugitive Emission Calculation Table
	Gas Cleaning System (2 units)	20,738	molten steel	0.0800	lb/ton	99.72%	0.00%	0.8272	0.1889	AIRS
	Hot Metal Desulfurization Baghouse	17,627	hot metal	0.0024	lb/ton	98.50%	0.00%	0.0208	0.0048	ISPAT Inland Stack Test
	Continuous Casting	20,738	molten steel	0.00	lb/ton	0.00%	0.00%	0.0000	0.0000	Not Applicable
	CAS Bell/OB Lancing Baghouse	20,738	molten steel	0.0000	lb/ton	94.99%	0.00%	0.0000	0.0000	Not Applicable
	Flux Handling Baghouse	20,738	molten steel	0.0000	lb/ton	99.00%	0.00%	0.0000	0.0000	No combustion
No. 1 BOP Caster	Fugitives (Roof Monitor)	20,738	molten steel	0.0000	lb/ton	0.00%	N/A	0.0000	0.0000	Not Applicable

US STEEL GARY WORKS
CONSTRUCTION PERMIT APPLICATION
BLAST FURNACE NO.13 RELINE
CHANGE IN EMISSION RATES FROM PROCESS SOURCES

NO_X

All Additional Hot Metal Through No. 1 BOP

Emission Unit	Emission Location	Annual Production/ Throughput Change	Units (tons)	Emission Factor	Units	Capture Efficiency	Control Efficiency	Annual Change in Emissions (tons/yr)	Annual Change in Emissions (lbs/hr)	Source of Emission Factor
No. 2 Q-BOP Shop LMF	Fugitives (Roof Monitor)					N/A	N/A	0.0000	0.0000	See NOx Fugitive Emission Calculation Table
	Gas Cleaning System (2 units)	0	molten steel	0.08	lb/ton	99.72%	0.00%	0.0000	0.0000	AIRS
	Hot Metal Desulfurization Baghouse	0	hot metal	0.0024	lb/ton	99.40%	0.00%	0.0000	0.0000	ISPAT Inland Stack Test
	Continuous Casting	0	molten steel	0.00	lb/ton	95.00%	0.00%	0.0000	0.0000	Not Applicable
	Secondary Emissions Baghouse	0	molten steel	0.0000	lb/ton	99.72%	0.00%	0.0000	0.0000	Not Applicable
	116' Elevation North and South Flux Handling System Baghouses	0	molten steel	0.00	lb/ton	99.00%	0.00%	0.0000	0.0000	Not Applicable
	North Roof Baghouse (166')	0	molten steel	0.00	lb/ton	99.00%	0.00%	0.0000	0.0000	Not Applicable
	South Roof Baghouse (166')	0	molten steel	0.00	lb/ton	99.00%	0.00%	0.0000	0.0000	Not Applicable
	Middle Roof Baghouse (166')	0	molten steel	0.00	lb/ton	99.00%	0.00%	0.0000	0.0000	Not Applicable
	Day Tank Lime Silo Baghouse	0	molten steel	0.00	lb/ton	99.00%	0.00%	0.0000	0.0000	Not Applicable
	Lime Dump Station Baghouse	0	molten steel	0.00	lb/ton	99.00%	0.00%	0.0000	0.0000	Not Applicable
	No. 1 Hot Fume Exhaust Baghouse	0	molten steel	0.003	lb/ton	94.99%	0.00%	0.0000	0.0000	Inland Steel EAF Shop modifications construction permit application submitted March 1994
	No. 2 Hot Fume Exhaust Baghouse	0	molten steel	0.003	lb/ton	94.99%	0.00%	0.0000	0.0000	Inland Steel EAF Shop modifications construction permit application submitted
	LMF 1 & 2 Material Handling System	0	molten steel	0.00	lb/ton	95.00%	0.00%	0.0000	0.0000	Not Applicable
	No. 3 LMF Hot Fume Extracation Exhaust	0	molten steel	0.003	lb/ton	97.99%	0.00%	0.0000	0.0000	Inland Steel EAF Shop modifications construction permit application submitted March 1994
	RH Vacuum Degasser Slag Conditioning Baghouse	0	molten steel	0.00015	lb/ton	100.00%	0.00%	0.0000	0.0000	Permit Application for PH Vacuum Degasser (October 1988)
	No. 3 LMF Material Handling System	0	molten steel	0.00000	lb/ton	97.99%	0.00%	0.0000	0.0000	Not Applicable
No. 2 Q-BOP Caster	Fugitives (Roof Monitor)	0	molten steel	0.0000	lb/ton	95.00%	N/A	0.0000	0.0000	Source registration notification submitted April 1995

Table 3-5a
US STEEL GARY WORKS
CONSTRUCTION PERMIT APPLICATION
BLAST FURNACE NO.13 RELINE
FUGITIVE EMISSION CALCULATION

NO_X

All Additional Hot Metal Through No. 1 BOP

Emission Unit	Emission Location	Annual Production/ Throughput Change	Units (tons)	Emission Factor	Units	Capture Efficiency	Annual Change in Emissions		Source of Emission Factor
							(tons/yr)	(lbs/hr)	
No. 1 BOP Shop	Gas Cleaning System (2 units)	20,738	molten steel	0.08	lb/ton	99.72%	0.0023	0.0005	Gas Cleaning System Factor
	Hot Metal Desulfurization Baghouse	17,627	hot metal	0.0024	lb/ton	98.50%	0.0003	0.0001	Hot Metal Desulf Factor
	CAS Bell Baghouse	20,738	molten steel	0.0000	lb/ton	94.99%	0.0000	0.0000	Not Applicable
	Flux Handling Baghouse	20,738	molten steel	0.0000	lb/ton	99.00%	0.0000	0.0000	Not Applicable
						Total Fugitives	0.003	0.001	
No. 2 Q-BOP Shop & LMF	Gas Cleaning System (2 units)	0	molten steel	0.08	lb/ton	99.72%	0.0000	0.0000	Gas Cleaning System Factor
	Hot Metal Desulfurization Baghouse	0	hot metal	0.0024	lb/ton	99.40%	0.0000	0.0000	Hot Metal Desulf Factor
	No. 1 Hot Fume Exhaust Baghouse	0	molten steel	0.003	lb/ton	94.99%	0.0000	0.0000	No. 1 Hot Fume Exhaust Factor
	No. 2 Hot Fume Exhaust Baghouse	0	molten steel	0.003	lb/ton	94.99%	0.0000	0.0000	No. 2 Hot Fume Exhaust Factor
	LMF 1 & 2 Material Handling System	0	molten steel	0.00	lb/ton	95.00%	0.0000	0.0000	Not Applicable
	No. 3 LMF Hot Fume Extracation Exhaust	0	molten steel	0.003	lb/ton	97.99%	0.0000	0.0000	No.3 LMF Hot Fume Extracation Factor
	RH Vacuum Degasser Slag Conditioning Baghouse	0	molten steel	0.00015	lb/ton	100.00%	0.0000	0.0000	RH Vacuum Degasser Factor
	LMF 3 Material Handling System	0	molten steel	0.00000	lb/ton	97.99%	0.0000	0.0000	Not Applicable
						Total Fugitives	0.0000	0.0000	

Table 3-11
US STEEL GARY WORKS
CONSTRUCTION PERMIT APPLICATION
BLAST FURNACE NO.13 RELINE
CHANGE IN EMISSION RATES FROM COMBUSTION SOURCES

NO_X

All Additional Hot Metal Through No. 1 BOP

Emission Unit	Emission Location	Throughput Change	Units	Emission Factor	Units	Capture Efficiency	Control Efficiency	Annual Change in Emissions (tons/yr)	Annual Change in Emissions (lbs/hr)	Source of Emission Factor
Blast Furnace No. 13	Stoves (NG)	7	mmcf	280.00	lb/mmcf	100.00%	0.00%	1.030	0.2352	AP-42 (1998)
	Stoves (BFG)	233	mmcf	0.61	lb/mmcf	100.00%	0.00%	0.071	0.0162	RATA Testing on Jan 2004
						Total Stoves		1.101	0.251	
TBBH Boilers	TBBH Boilers (BFG)	649	mmcf	0.61	lb/mmcf	100.00%	0.00%	0.198	0.0452	RATA Testing on Jan 2004
						Total Boiler House		0.20	0.05	

Table 3-6
US STEEL GARY WORKS
CONSTRUCTION PERMIT APPLICATION
BLAST FURNACE NO.13 RELINE
CHANGE IN EMISSION RATES FROM PROCESS SOURCES
CO

All Additional Hot Metal Through No. 1 BOP

Emission Unit	Emission Location	Annual Production/ Throughput Change	Units (tons)	Emission Factor	Units	Capture Efficiency	Control Efficiency	Annual Change in Emissions		Source of Emission Factor
								(tons/yr)	(lbs/hr)	
No. 13 Blast Furnace	Casthouse Fugitives	17,627	hot metal	0.000	lb/ton	99.80%	N/A	0.0000	0.0000	Not Applicable
	Casthouse Emission Control Baghouse	17,627	hot metal	0.000	lb/ton	99.80%	0.00%	0.0000	0.0000	Not Applicable
	Slag Pit Operations	4,407	slag	0.081	lb/ton	0.00%	0.00%	0.1779	0.0406	ISPAT Inland Permit Application
PCI	Coal Pulverizer Bldg.	2,644	coal	0.000	lb/ton	N/A	N/A	0.0000	0.0000	Not Applicable
No. 1 BOP Shop	Fugitives (Roof Monitor)					N/A	N/A	4.0065	0.9147	See CO Fugitive Emission Calculation Table
	Gas Cleaning System (2 units)	20,738	molten steel	138.00	lb/ton	99.72%	94.35%	80.6193	18.4062	AIRS, Carbon Balance and March 1996 Stack Test
	Hot Metal Desulfurization Baghouse	17,627	hot metal	0.00	lb/ton	98.50%	0.00%	0.0000	0.0000	Not Applicable
	Continuous Casting	20,738	molten steel	0.00	lb/ton	0.00%	0.00%	0.0000	0.0000	Not Applicable
	CAS Bell/OB Lancing Baghouse	20,738	molten steel	0.0000	lb/ton	94.99%	0.00%	0.0000	0.0000	Not Applicable
	Flux Handling Baghouse	20,738	molten steel	0.0000	lb/ton	99.00%	0.00%	0.0000	0.0000	Not Applicable
No. 1 BOP Caster	Fugitives (Roof Monitor)	20,738	molten steel	0.0000	lb/ton	0.00%	N/A	0.0000	0.0000	Not Applicable

US STEEL GARY WORKS
CONSTRUCTION PERMIT APPLICATION
BLAST FURNACE NO.13 RELINE
CHANGE IN EMISSION RATES FROM PROCESS SOURCES

CO

All Additional Hot Metal Through No. 1 BOP

Emission Unit	Emission Location	Annual Production/ Throughput Change	Units (tons)	Emission Factor	Units	Capture Efficiency	Control Efficiency	Annual Change in Emissions (tons/yr)	Annual Change in Emissions (lbs/hr)	Source of Emission Factor
No. 2 Q-BOP Shop LMF	Fugitives (Roof Monitor)					N/A	N/A	0.0000	0.0000	See CO Fugitive Emission Calculation Table
	Gas Cleaning System (2 units)	0	molten steel	138.00	lb/ton	99.72%	94.35%	0.0000	0.0000	AIRS, Carbon Balance and March 1996 Stack Test
	Hot Metal Desulfurization Baghouse	0	hot metal	0.00	lb/ton	99.40%	0.00%	0.0000	0.0000	Not Applicable
	Continuous Casting	0	molten steel	0.00	lb/ton	95.00%	0.00%	0.0000	0.0000	Not Applicable
	Secondary Emissions Baghouse	0	molten steel	0.00	lb/ton	99.72%	0.00%	0.0000	0.0000	Not Applicable
	116' Elevation North and South Flux Handling System Baghouses	0	molten steel	0.00	lb/ton	99.00%	0.00%	0.0000	0.0000	Not Applicable
	North Roof Baghouse (166')	0	molten steel	0.00	lb/ton	99.00%	0.00%	0.0000	0.0000	Not Applicable
	South Roof Baghouse (166')	0	molten steel	0.00	lb/ton	99.00%	0.00%	0.0000	0.0000	Not Applicable
	Middle Roof Baghouse (166')	0	molten steel	0.00	lb/ton	99.00%	0.00%	0.0000	0.0000	Not Applicable
	Day Tank Lime Silo Baghouse	0	molten steel	0.00	lb/ton	99.00%	0.00%	0.0000	0.0000	Not Applicable
	Lime Dump Station Baghouse	0	molten steel	0.00	lb/ton	99.00%	0.00%	0.0000	0.0000	Not Applicable
	No. 1 Hot Fume Exhaust Baghouse	0	molten steel	0.05	lb/ton	94.99%	0.00%	0.0000	0.0000	Inland Steel EAF Shop modifications construction permit application submitted March 1994
	No. 2 Hot Fume Exhaust Baghouse	0	molten steel	0.05	lb/ton	94.99%	0.00%	0.0000	0.0000	Inland Steel EAF Shop modifications construction permit application submitted March 1994
	LMF 1 & 2 Material Handling System	0	molten steel	0.00	lb/ton	95.00%	0.00%	0.0000	0.0000	Not Applicable
	No. 3 LMF Hot Fume Extracation Exhaust	0	molten steel	0.05	lb/ton	97.99%	0.00%	0.0000	0.0000	Inland Steel EAF Shop modifications construction permit application submitted March 1994
	RH Vacuum Degasser Slag Conditioning Baghouse	0	molten steel	0.887	lb/ton	100.00%	0.00%	0.0000	0.0000	Weight percent of carbon in steel before and after degassing process. Assume all carbon removed during the degassing process is converted to CO.
	No. 3 LMF Material Handling System	0	molten steel	0.000	lb/ton	97.99%	0.00%	0.0000	0.0000	Not Applicable
No. 2 Q-BOP Caster	Fugitives (Roof Monitor)	0	molten steel	0.0000	lb/ton	95.00%	N/A	0.0000	0.0000	Source registration notification submitted April 1995

Table 3-6a
US STEEL GARY WORKS
CONSTRUCTION PERMIT APPLICATION
BLAST FURNACE NO.13 RELINE
FUGITIVE EMISSION CALCULATION

CO

All Additional Hot Metal Through No. 1 BOP

Emission Unit	Emission Location	Annual Production/ Throughput Change	Units (tons)	Emission Factor	Units	Capture Efficiency	Annual Change in Emissions		Source of Emission Factor
							(tons/yr)	(lbs/hr)	
No. 1 BOP Shop	Gas Cleaning System (2 units)	20,738	molten steel	138.00	lb/ton	99.72%	4.0065	0.9147	Gas Cleaning System Factor
	Hot Metal Desulfurization Baghouse	17,627	hot metal	0.00	lb/ton	98.50%	0.0000	0.0000	Not Applicable
	CAS Bell Baghouse	20,738	molten steel	0.0000	lb/ton	94.99%	0.0000	0.0000	Not Applicable
	Flux Handling Baghouse	20,738	molten steel	0.0000	lb/ton	99.00%	0.0000	0.0000	Not Applicable
						Total Fugitives	4.007	0.915	
No. 2 Q-BOP Shop & LMF	Gas Cleaning System (2 units)	0	molten steel	138.00	lb/ton	99.72%	0.0000	0.0000	Gas Cleaning System Factor
	Hot Metal Desulfurization Baghouse	0	hot metal	0.00	lb/ton	99.40%	0.0000	0.0000	Not Applicable
	No. 1 Hot Fume Exhaust Baghouse	0	molten steel	0.05	lb/ton	94.99%	0.0000	0.0000	No.1 Hot Furme Exhaust Factor
	No. 2 Hot Fume Exhaust Baghouse	0	molten steel	0.05	lb/ton	94.99%	0.0000	0.0000	No.2 Hot Fumre Exhaust Factor
	LMF 1 & 2 Material Handling System	0	molten steel	0.00	lb/ton	95.00%	0.0000	0.0000	Not Applicable
	No. 3 LMF Hot Fume Extracation Exhaust	0	molten steel	0.05	lb/ton	97.99%	0.0000	0.0000	No.3 LMF Hot Fume Extracation Factor
	RH Vacuum Degasser Slag Conditioning Baghouse	0	molten steel	0.887	lb/ton	100.00%	0.00E+00	0.00E+00	RH Vacuum Degasser Factor
	LMF 3 Material Handling System	0	molten steel	0.000	lb/ton	97.99%	0.0000	0.0000	Not Applicable
						Total Fugitives	0.0000	0.0000	

Table 3-12
US STEEL GARY WORKS
CONSTRUCTION PERMIT APPLICATION
BLAST FURNACE NO.13 RELINE
CHANGE IN EMISSION RATES FROM COMBUSTION SOURCES

CO

All Additional Hot Metal Through No. 1 BOP

Emission Unit	Emission Location	Throughput Change	Units	Emission Factor	Units	Capture Efficiency	Control Efficiency	Annual Change in Emissions		Source of Emission Factor
								(tons/yr)	(lbs/hr)	
Blast Furnace No. 13	Stoves (NG)	7	mmcf	84.00	lb/mmcf	100.00%	0.00%	0.309	0.0705	AP-42 (1998)
	Stoves (BFG)	233	mmcf	26.50	lb/mmcf	100.00%	0.00%	3.083	0.7039	Stack tests at TBBH No. 4
	Total Stoves							3.392	0.774	
TBBH Boilers	TBBH Boilers (BFG)	649	mmcf	26.50	lb/mmcf	100.00%	0.00%	8.595	1.9623	Stack tests at TBBH No. 4
	Total Boiler House							8.595	1.962	

9/13/2005 07:59 AM
BOP1 calcs,3-12